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STATE OF NEW YORK

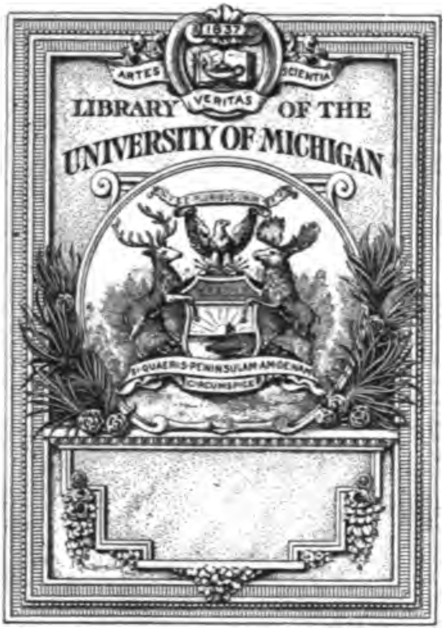
FOREST, FISH AND GAME COMMISSION

EIGHTH ANNUAL REPORT

1902.

TRANSMITTED TO THE LEGISLATURE JANUARY 30, 1903

ALBANY
J. B. LYON COMPANY, PRINTERS
1903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STATE OF NEW YORK

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EIGHTH ANNUAL REPORT

OF THE

Forest, Fish and Game Commission.

ALBANY, N. Y., *January* 30, 1903.

Hon. S. FREDERICK NIXON, *Speaker of the Assembly:*

Sir.—We have the honor to submit herewith, as required by law, the official report of this Commission for the year ending September 30, 1902.

Very truly yours,
TIMOTHY L. WOODRUFF,
President,
DEWITT C. MIDDLETON,
CHARLES H. BABCOCK,
Commissioners of Forest, Fish and Game.

183839

STATE OF NEW YORK.

Forest, Fish and Game Commission.

TIMOTHY L. WOODRUFF, *President*, - - - Brooklyn, N. Y.
DEWITT C. MIDDLETON, - - - - - Watertown, N. Y.
CHARLES H. BABCOCK, - - - - - - Rochester, N. Y.

Standing Committees.

Forestry, - - - - - - - - Commissioner Middleton.
Fishculture and Hatcheries, - - - - - Commissioner Babcock.
Shellfisheries, - - - - - - - Commissioner Woodruff.

Assistant Secretary, - - - - - John D. Whish, Albany, N. Y.
Superintendent of Forests, - - - - William F. Fox, Albany, N. Y.
Chief Game Protector, - - - - - J. Warren Pond, Albany, N. Y.
Superintendent of Shellfisheries, - - - B. Frank Wood, Jamaica, N. Y.

Report of the Forest, Fish and Game Commission.

To the Honorable the Legislature:

The Commission in presenting its final report as at present constituted has the pleasant satisfaction of knowing that its work has had the commendation of the public, and that the value of what has been done for the protection of fish and game and the reforestation of denuded woodlands in the Adirondack and Catskill regions has been recognized both at home and abroad.

Standards of comparison are not as well established as yet in our own country as they are in other parts of the civilized world for such matters, and an occasional criticism is consequently to be expected either from the uninformed or the unthinking. But it is certain that dollar for dollar the State of New York is getting more for its expenditure for the business which the Commission has had in charge than any other locality at present known. The work of the forestry department has developed in value to the extent that its success is frequently commended and its documents are considered very desirable for public distribution. Advice on important questions is sought from our Department of Fisheries by the experts of other countries, and the game laws of this State are frequently used as models by other lawmakers.

The sagacious editor of the London *Spectator*, in reviewing a recent report of this Commission, after paying a high tribute to the wisdom shown by the State of New York in providing adequately for the preservation of its forests and the increase of its fish and game supply, says:

> Omitting moneys spent on purchasing land and maintaining forests the total cost of fish propagation, fish and game protection, the shellfish department and taking deer to the forests, with some items for printing was about £30,000. The fish cost a little over £11,000, the game keeping generally £10,000 and the shellfish (a remunerative item) £2,000. In return for this the public had free fishing of every kind over a vast territory, and killed deer to an amount which, at the ordinary rate reckoned per stag in Scotland (£40), would represent a sporting rental in this country of £169,000!

In the same line of testimony is the following quotation from a scientific monograph produced in our own State by an expert of well established reputation. In a recent bulletin on The Clam and Scallop Industries, issued by the State Museum, Dr. J. L. Kellogg says:

> Every one is familiar with the extensive and remarkably successful work of the United States and the various State Fish Commissions in the propagation of marine and fresh water market fish. In many cases, the continued supply is probably directly and entirely due to the artificial hatching and judicious distribution of the young fish. These institutions have made it very clear that public moneys could not be better expended for the benefit of all classes of people than in their support. * * * If the fact were only recognized that this extinction of forms really is occurring, these Commissions and similar institutions would receive much greater support in the form of legislative appropriations. * * * It is money most profitably invested for rich and poor alike.

Such testimony and approval of the work that is being done could be continued at length, but the facts are for the most part known to your honorable body and to the well informed taxpayers of the State at large. The value of the Adirondacks as a wealth producing element in the State is properly shown in one of the appended reports, and the figures given indicate that millions of dollars are annually spent because of the attractions of the woods and waters for health and pleasure seekers and sportsmen. To preserve and build up the forests has been the constant care of the Commission, and many members of the legislature can testify from actual knowledge as to what has been done toward providing trees to fill out the denuded places. The nurseries for producing the young trees are well established, and will increase steadily in value, as the work advances. In time the State will be able to provide from them not only all the trees necessary for use in the forests but also for beautifying roadsides and the streets of our cities, as well as for renewing the old and neglected woodlots of our farms.

Attention is also called with pride to the work done in protecting the forests from fire. The State now has a most excellent organization for this purpose, and the result is readily seen from the fact that our forests have practically escaped damage from this source. Reports from other States do not show such immunity. The statements in detail in the reports of the Superintendent of Forests, the Chief Protector and the Superintendent of Shellfisheries, which follow, are well worth the attention of every sportsman and every taxpayer as well. Therein will be found ample evidence that the money appropriated for the propagation of fish and the protection of game has been well expended, and that the result secured has merited the favorable comment already quoted. Communications received from time to time bear witness to the fact that line fishing in the waters of the State was never better, while the returns from the net fishermen prove that a far greater variety of cheap food fish of the best quality is easily procurable on account of the constant care exercised by the State in stocking its waters. The increase in the number of deer taken is also worth noting, as an evidence of the wisdom of existing laws. So also is the suggestion which experience has shown to be necessary for the preservation of certain fisheries by stopping fishing through the ice. Protective action would also seem to be necessary to keep the black bear from extermination.

The Commission in conclusion takes pleasure in calling attention to the success which has thus far attended the work of restoring moose to the Adirondacks, and to the valuable additions made to the herds of elk during the past year.

The following recommendations are presented for your consideration:

That the number of expert foresters be increased to four, and their compensation be made such as to retain them in the service of the State.

That the John Brown house be repaired so as to preserve this historic structure.

That spring shooting of wild fowl and birds of all kinds be prohibited.

That the shooting of black bear in the Adirondack region be prohibited for a period of five years.

That a license fee of $50 be imposed on non-resident hunters excepting members of organized clubs in the Adirondacks, who shall present certificates of membership, and Adirondack land owners.

That provision be made for the licensing of guides.

BY THE COMMISSION.

JOHN D. WHISH,
Assistant Secretary.

REPORT

Superintendent State Forests.

JANUARY 1, 1903.

Report of the Superintendent of Forests.

To the Forest, Fish and Game Commission:

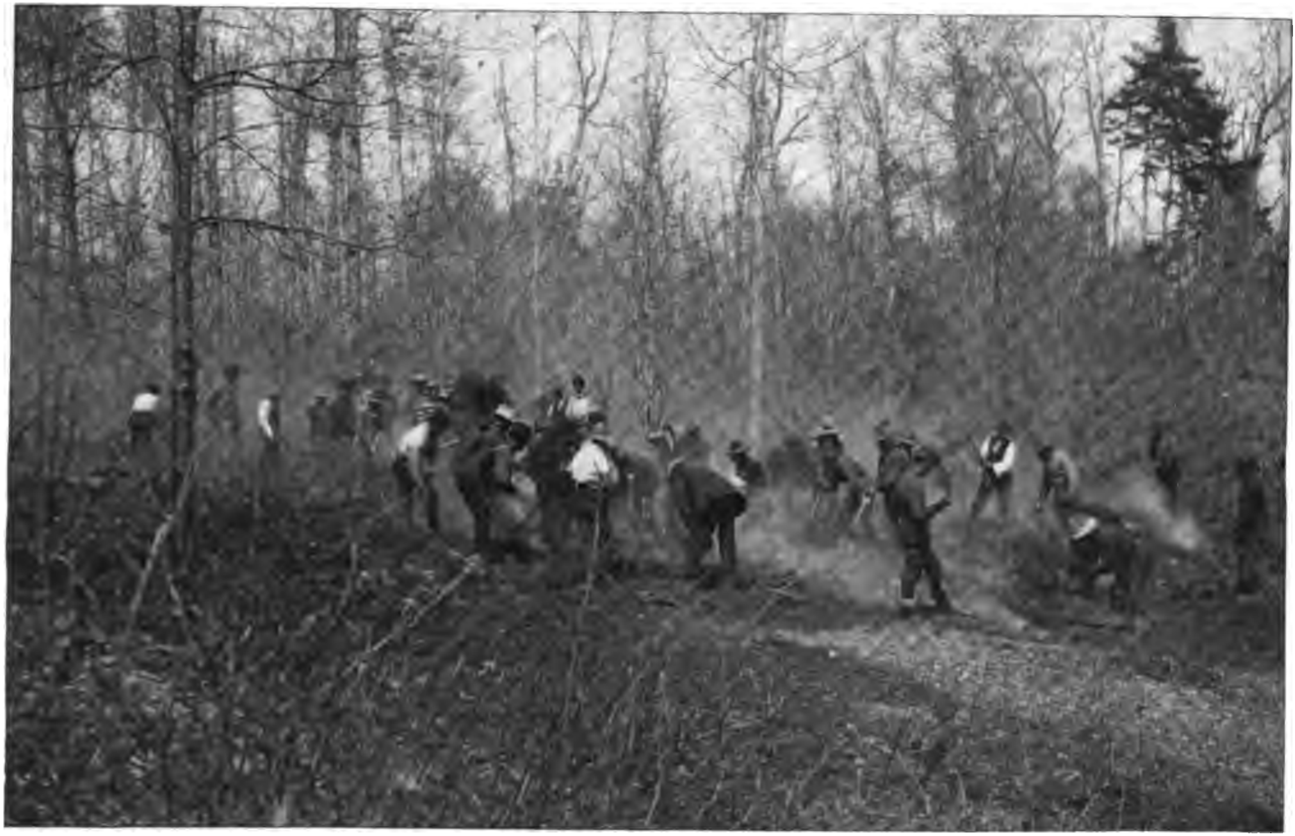
Gentlemen.—In carrying on the forestry work of the Commission during the past year special attention has been given, as usual, to the protection from fire of the forests in the Adirondack and Catskill towns, both public and private. The results are satisfactory and encouraging. While many other States, especially those of the Northwest and Pacific slope, have suffered severe losses from forest fires, the wooded areas of New York have been comparatively free from any serious or extensive damage from this source, the fires in this State having occurred, for the greater part, on waste lands or tracts that had been burned over previously, some of them repeatedly.

The total area thus injured in 1902, as shown by the reports of the town firewardens, embraced 21,356 acres, three-fourths of which, or thereabouts, consisted of waste land on which there was no standing timber of merchantable value. The actual area of forest land overrun by fire amounted to only 4,345 acres, of which 458 acres belonged to the Forest Preserve.

The total loss on this standing timber, as taken from the estimates in the firewardens' reports, amounted in the aggregate to $9,150. The total number of days worked by the men ordered out to fight fire was 2,405. As the State refunds to the towns half of the expense incurred in such work, the amount due from the Commission in settlement of these claims is estimated at $2,700. The exact sum cannot be stated now, as a few of the firewardens' accounts have not been adjusted yet by their respective towns, the auditors having taken exception to some of the items or refused to pay the bill entirely. There will be no rebate to towns which are still in debt to the State for money advanced to hire men during the fires of 1899.

As usual the causes of these fires were various, the principal ones being in their order as follows: The carelessness of farmers in burning brush for agricultural purposes; sparks from railroad locomotives; and the camp, or coffee, fires left by fishermen and hunters. Berry pickers, tramps, picnic parties, summer boarders, and boys at play were each responsible for one or two cases. One fire was started by an insane man, and one caught from a charcoal burner's pit. The returns include also, as in previous years, a large number of reports with the statement "Cause unknown."

The figures for the forest area burned (4,345 acres), and the total damage ($9,150), show a gratifying decrease when compared with the great losses from this source which occurred almost annually in New York before the establishment of its Forestry Department. Perhaps their significance will be better understood if considered in connection with the statistics showing the total burned area and loss from forest fires throughout the United States, in which, according to the estimates of the United States Bureau of Forestry, there occur annually forest fires that on an average burn over an area of 10,274,089 acres, destroying at least $25,000,000 worth of real property, and in which on an average 60 human lives are lost yearly. A special agent of the Government Bureau, after a careful examination of the territory, reports that the forest fires this last fall in the States of Oregon and Washington destroyed standing timber and other property to the value of $12,767,100. He might have added that these fires were accompanied by the usual loss of life. Thirty-eight dead bodies were found in one place—in the Lewis River Valley, Washington. In the neighboring State of New Jersey forest fires last year covered 98,850 acres, and inflicted damages to the amount of $168,333 as officially reported.



ATTACKING A FIRE IN TIME.

C. R. Pettis, photo.

These statistics need not excite surprise if one recalls the terrible loss of life and widespread destruction of timber from forest fires that have occurred repeatedly in the Northwestern States. In the great fires that swept over parts of Northern Michigan, Wisconsin, and Minnesota in October, 1871, over one thousand persons lost their lives and fifteen thousand were made homeless. The value of the standing timber destroyed was never estimated closely, but it amounted to several million dollars. In the fires of 1881, 1894 and 1896, hundreds of people were burned to death and wide areas of valuable timber destroyed in that same region.

And, yet, these fires started from some little blaze that, as was the case with the Hinckley disaster in 1894, had smouldered for days before it attained headway*, and which could have been prevented had there been an efficient organization for extinguishing them while in an incipient stage.

In the returns made by the firewardens of the State of New York for the year 1902 much of the burned territory included in their reports consisted of open country on which there were no trees, the land being covered with brier patches or shrubs of small growth. There were large areas, also, covered with huckleberry bushes, that were set on fire and burned over by the natives to increase the crop of fruit gathered annually from these places. This was especially the case in some of the Catskill towns, where the picking of berries on wild land furnishes employment each season for a large number of people—men, women and children. These areas, if not burned over, would in time be covered with a growth of trees that would be valuable for the protective functions exercised, even if the species did not furnish marketable timber. These trees would be available also for fuel; and the saplings, when properly thinned by foresters, would supply to a large extent the market for hoop-poles. The wardens have made special efforts to prevent fires of this class, with the result that the burned areas from this cause have been materially reduced. Still, as there is great difficulty in detecting offenders of this kind the recurrence of the evil to some extent may be expected each season. It is doubtful if the time will ever come, however vigilant and watchful our firewardens may be, when forest fires will entirely cease. If all our citizens were intelligent, careful and honest, there would be no fires. But this millennial condition has not arrived, and we cannot expect entire exemption for our forests any more than for our cities and villages, which for many years to come will find it necessary to maintain their fire departments.

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* A detailed and interesting account of the great fires of 1894 may be found in the annual report of the New York State Forest Commission for that year.

In some of the Catskill towns there has been a disposition on the part of the auditing boards to throw out the bills of the firewardens entirely, the supervisors claiming that as there is little or no State land in the town the Forest Commission had no right to appoint a firewarden; and that the town can take care of its own affairs in this respect without any intervention by the State authorities. But the Forest Law provides that, "The Commission shall from time to time in every town having lands which are part of the Forest Preserve, *and may in every town having lands which would become part of the Forest Preserve if acquired by the State,* appoint a firewarden who shall act during the pleasure of the Commission."

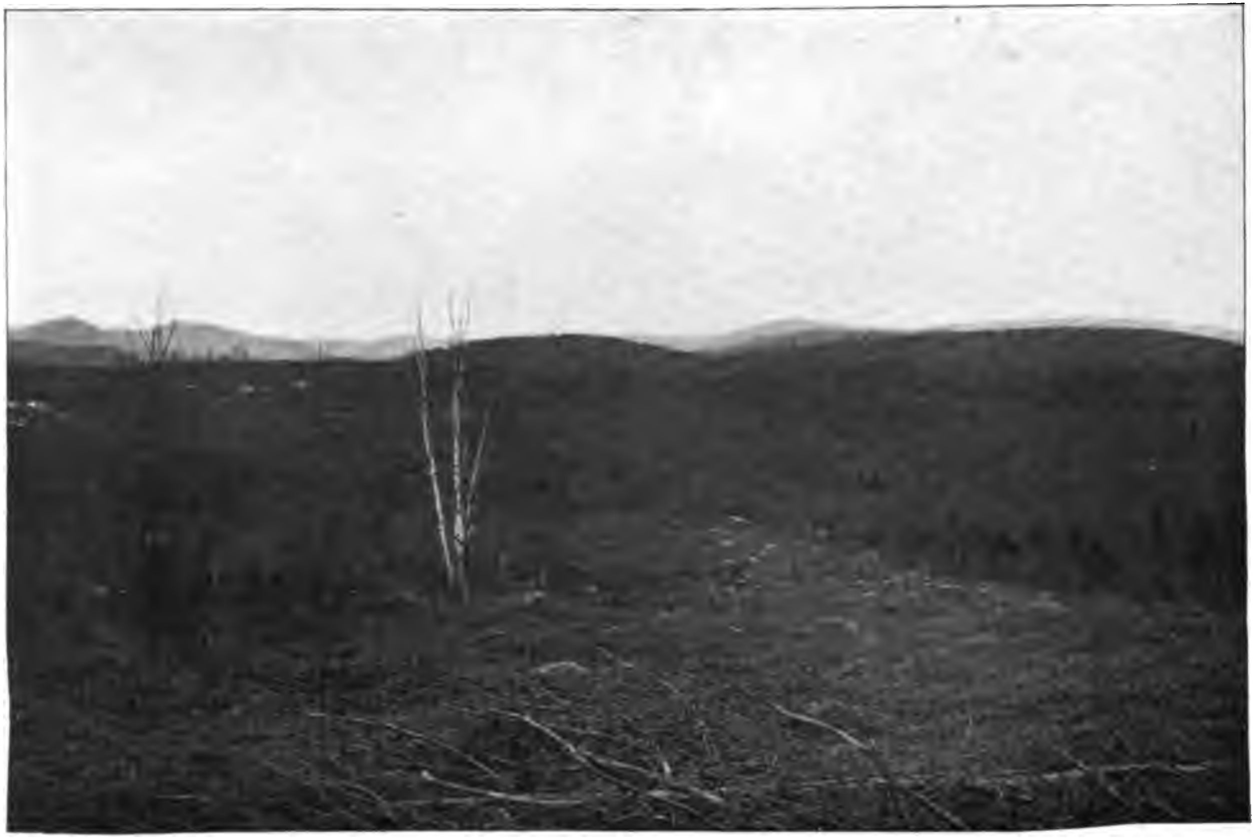
The clause italicized here became necessary because of the negligence shown by the authorities of certain forest towns in protecting their woodlands from fire. It is conceded that the State holdings in these towns are small, and that in a few instances there are none. But these towns contain large wooded areas, a great portion of which are owned by non-residents. The public interests demand that these forests should be protected and preserved, no matter who owns them. True, a private owner can cut his timber if he wants to; but the people at large will naturally protest against its unnecessary destruction by fire. The observation of the Department has been that in the towns where there are no firewardens belonging to the organized force the forests are destroyed in an alarming extent. In such towns the supervisor is firewarden *ex officio*, being invested with all the powers and duties pertaining to that office elsewhere. But the supervisor too often is unaware that he must act as firewarden; he is not in touch with the Chief Firewarden of the State; he lacks the interest and efficiency displayed by the firewardens in the organized force; and, as he holds an elective office, he must give way in time to his successor instead of holding the position permanently like the firewardens appointed by the Commission.

It has been suggested that when a recalcitrant town board refuses to recognize the firewarden appointed by the Commission, merely because the State owns little or no land in the town, that the Commission might in retaliation make no appointment of a firewarden, and thus deprive the town of the rebate of one-half the expenses incurred in fighting its forest fires. But this would not remedy the real evil—the undue destruction of woodlands in that locality.

As an instance of the lack of attention given to forest fires in towns outside the counties containing the Forest Preserve, and in which there is no organized force under the control of the Chief Firewarden, let me cite a representative case. In 1899, in the town of Adams, Jefferson County, a forest fire was raging, whereupon the residents in its vicinity notified the supervisor that he ought to give it necessary attention. He neglected to do so, paying no heed to the danger aside from asking someone to look after the fire and extinguish it. Ineffectual attempts were made by a few of the people to check its progress, and from Tuesday to Friday of the same week the supervisor was appealed to by interested parties to protect their property. These people informed him that the men he had asked to go to the fire were not accomplishing anything, and that the neighbors would not turn out to fight the fire under the orders or direction of the men he had engaged to attend to it.

On Friday, after much had been said about his neglect of duty, he went to the fire, ordered out a posse of citizens, assumed charge of the work and extinguished the flames; but not until the woodlands of several people had been destroyed or seriously damaged. One of the parties whose woods had been injured, Mrs. Lois L. Garnett, sued the supervisor for neglect of duty. The case was finally disposed of in the Supreme Court at Watertown, N. Y., in May, 1902, the plaintiff obtaining a verdict for damages in the sum of $252. As others were ready to commence similar actions as soon as the case was decided an appeal was taken for the purpose of effecting a settlement with the various claimants in order to save the supervisor from the expense of further litigation, after which he made a satisfactory arrangement with each of the aggrieved parties. The negligence of the supervisor in this instance cost him $1,659.79 to settle the various claims, not including the additional expense of litigation, all of which he must lose unless the taxpayers of the town vote to reimburse him.

It has also happened that in the prosecution of persons for violation of the Fire Law satisfactory results were not always obtained, owing to the reluctance of the jury to find a verdict in favor of the State as against a neighbor. In each case the attorney for the defendant appealed to the sympathy of the jury in favor of his poverty-stricken client, so described, and at the same time derided and denounced the State officials, who were represented as persecuting



C. R. Pettis, photo.

Site of Plantation (1902) Between Lake Clear Junction and Saranac Lake.
View of denuded lands before planting.

the poor farmer and seeking to prevent him from planting a few potatoes on his own land, or burning a fallow preparatory to the same.

Last spring the Chief Firewarden arrested two men in Lewis County for burning brush and logs during a period prohibited by law, and for allowing the fire to escape to adjoining forests, where it caused a serious destruction of timber. It was a second offense, the defendants having been convicted of the same violation of law in the previous year. The case was tried at Lowville before a justice of the peace and a jury summoned especially for this action. The evidence was more than sufficient to prove the guilt of the prisoners. Reputable citizens testified that they were on the ground and saw the parties heaping up the brush and logs on burning piles. The local firewarden swore that he remonstrated with them for starting a brush fire at that time in violation of the statute, and further testified that the forest fire which ensued was directly traceable to the burning brush heaps. But the jury rendered a verdict of not guilty. The evidence against the defendants, however, was so ample and convincing that the Chief Firewarden appealed the case to the Supreme Court, where the action is now pending.

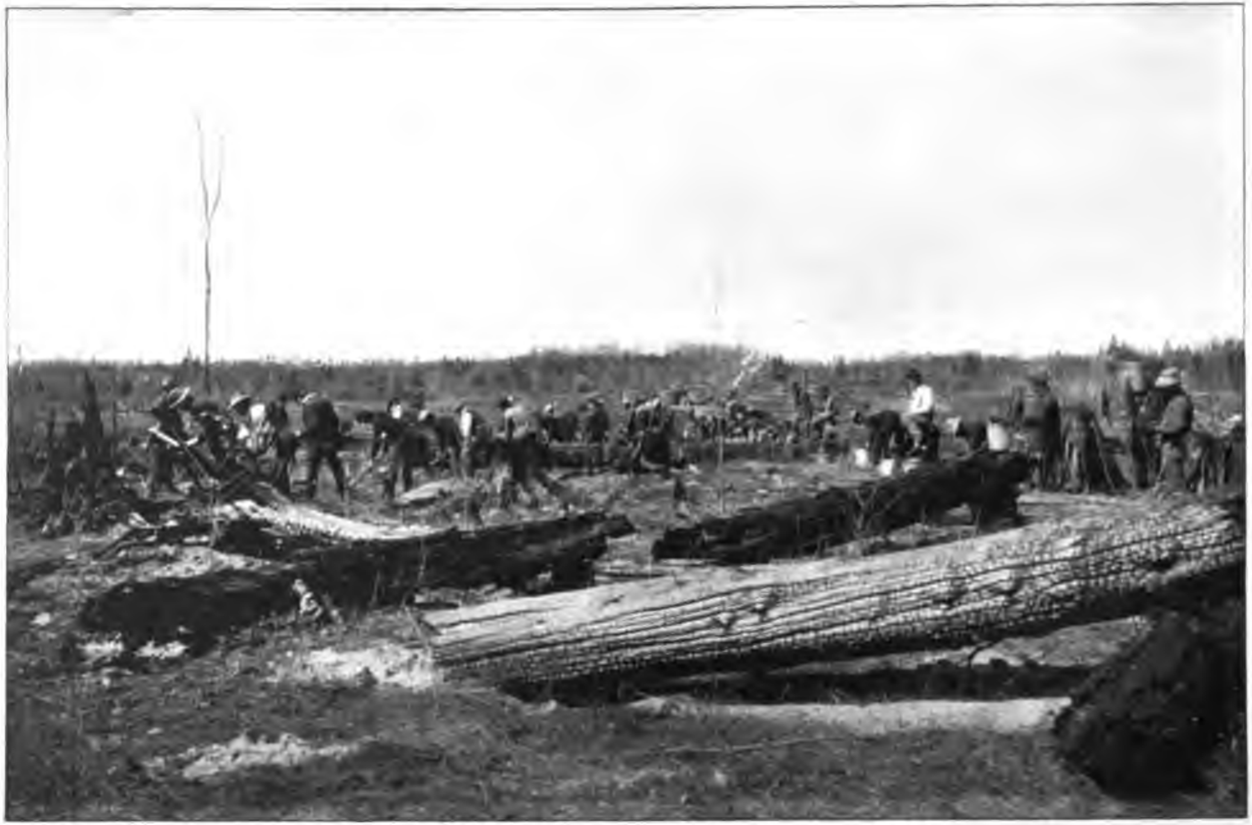
Some of the farmers living in the forest towns complain that the close season on fallow fires interferes with their agricultural work. The State Forestry Law provides that in certain specified towns fallows shall not be burned between April 1st and June 10th, or from September 1st to November 10th. This provision became necessary owing to the large number of woodland fires that caught from burning fallows each year during these periods, and which could not well occur if the trees were in full leaf. It is admitted that the law is a hardship to some extent; but the carelessness of petty farmers in the use of fire for clearing wild land became so widespread and unrestrainable that no other remedy was available.

During the past season the Chief Firewarden has prosecuted successfully thirteen actions against parties who burned their fallows out of season, the fines thus collected ranging from fifteen to twenty-five dollars in each case—in most of the instances the latter amount. Some of the parties thus arraigned protested strenuously, urging in extenuation of their offense that the fire was wholly on their own land, that it had not escaped therefrom into any woods or on to the property of any other person, and, furthermore, that they had gone to an extra expense to prevent any such occurrence. In reply it was pointed out to them that while this was readily conceded there were many others who were not so careful in managing their fires, and that in prosecuting the latter no opportunity should be given them to charge that any distinction or alleged favoritism had been made in proceeding against all persons who set fire to their fallows during the close season established by law.

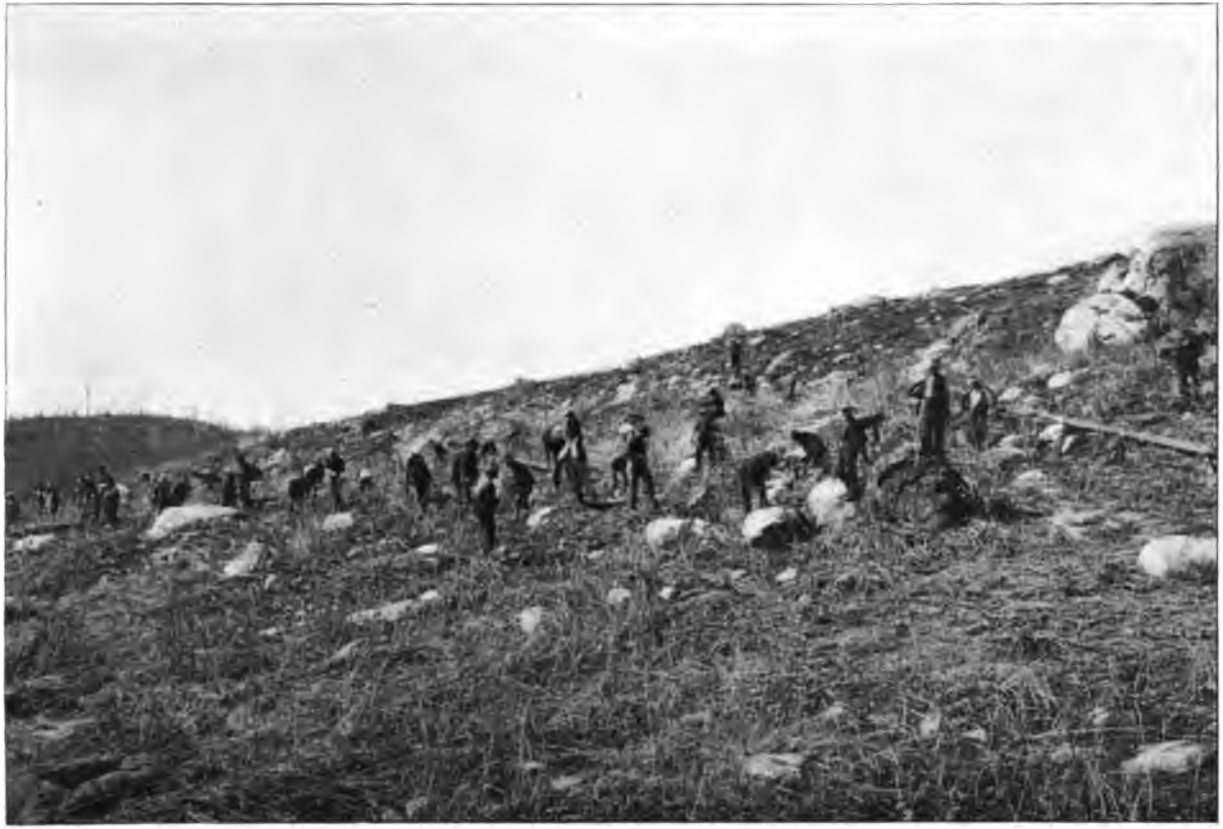
In connection with this subject ample acknowledgment is due Mr. L. S. Emmons, the Chief Firewarden, for the energetic, fearless work performed by him in prosecuting violations of the law, and for the efficient service rendered in discharge of all the various duties pertaining to his office.

REFORESTATION.

At the risk of what may seem a useless repetition of former reports, I again call attention to the fact that, owing to the restrictions in the forestry clause of the State Constitution, this Department cannot undertake any scientific work in the line of forest improvement that necessitates the cutting of timber. The woodlands placed under the care and management of the Commission must remain as they are, untouched and unimproved. Our foresters are debarred from doing any work that would increase the productivity of these forests by the cutting of diseased



Planting on Burned Land, Once Covered with White Pine. C. R. Pettis, photo.



PLANTING ROCKY GROUND NEAR THE LINE OF THE N. Y. C. & H. R. R. R.

C. R. Pettis, photo.

or decaying trees, or by the substitution of merchantable species for worthless ones. Matured trees must be left to fall and become breeding places for destructive insects, while under the clearly expressed mandate of the law no timber can be removed and converted into money, even when it is killed by fire, or where, still green and uninjured, it covers the ground for a thousand acres or more in some windfall. This is not said in any spirit of complaint, or in advocacy of any change in the law; but rather to account for the absence of any scientific forestry work in the management of the woodlands belonging to the State. Some such explanation seems necessary in view of the thoughtless criticisms that have been made by persons who were evidently unaware that the scientific methods of forest treatment suggested by them could not be undertaken lawfully by the Commission.

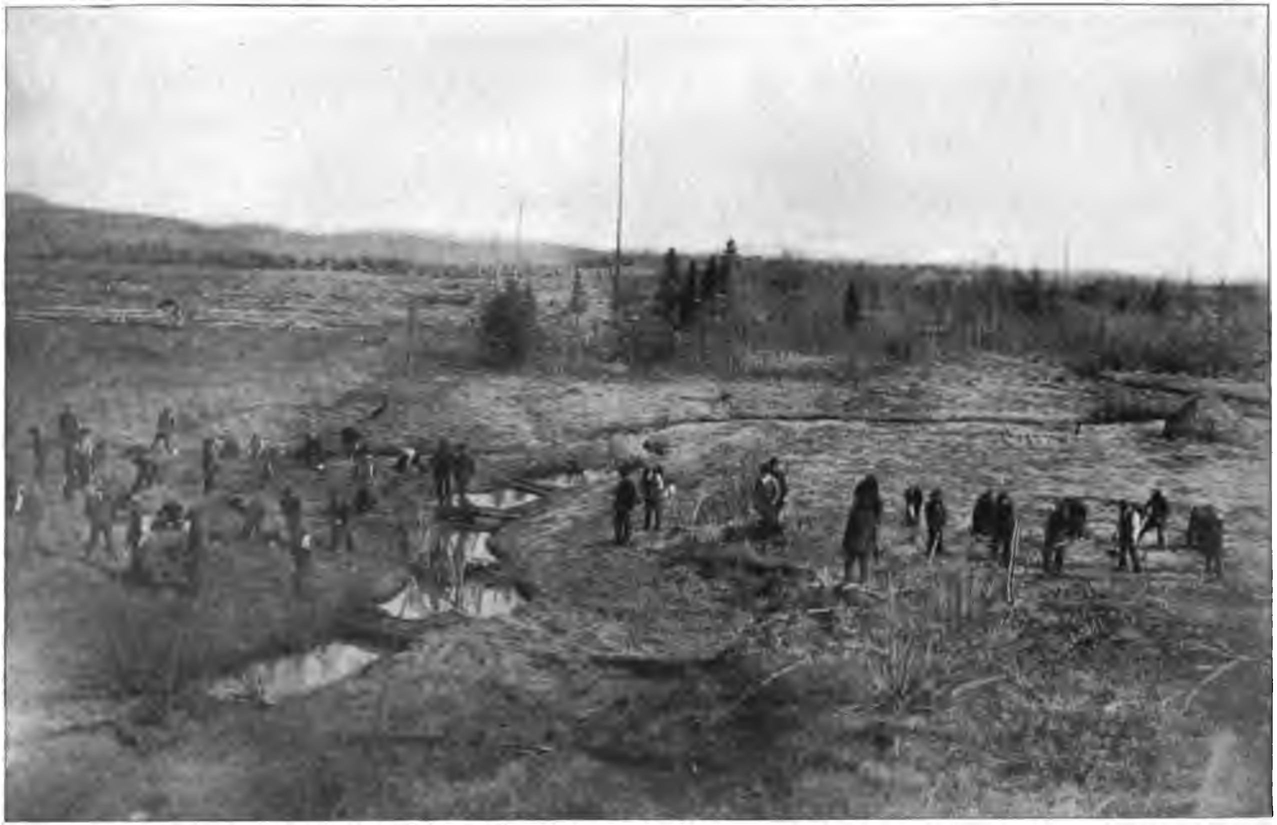
Fortunately, the Constitutional restrictions do not interfere with silvicultural operations incidental to the reforesting of denuded lands, and so the Commission has undertaken the work of planting the burned and waste areas of the Preserve with seedling trees of merchantable species. That there is a wide field for operations of this kind is evident, in view of the fact that within the Adirondack Park there are 50,592 acres classified as waste, burned, or denuded, to say nothing of a similar class of lands in the Forest Preserve which are situated outside the park boundary, or so-called " Blue Line."

Small plantations had already been made by our foresters on State lands in the Catskills, in 1900 and 1901, the comparatively slight expense of which encouraged the Commission to undertake last spring the reforesting of a large tract in the Adirondacks. In Franklin County, near Lake Clear Junction, there is a large area of State land that had been closely lumbered, after which it became denuded by repeated fires. The ground, which originally sustained a growth of large white pine, was covered with ferns and huckleberry bushes, with here and there small areas of swampy land or thickets of young evergreens and poplars. It was mostly an open plain extending several miles in either direction, its level expanse being broken in places by low hills or long, rolling ridges. The soil is sandy, covered with a thin deposit of ashes left from forest fires. The latter conditions, however, were not unfavorable; for a sandy soil forms the natural habitat of the White Pine, and the small admixture of ashes has some value as a fertilizer.

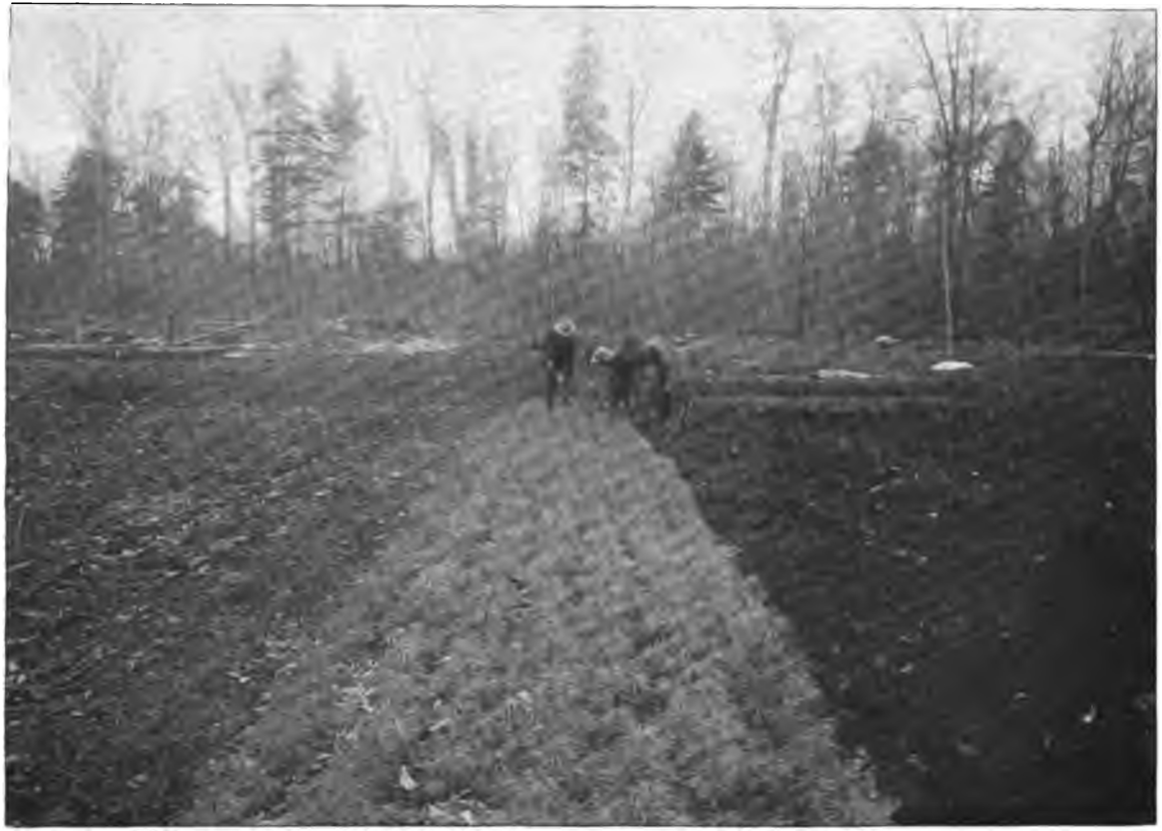
The highway from Saranac Inn to Harrietstown skirts the northern boundary of the tract, while a branch of the New York Central Railroad, running from Lake Clear Junction to the village of Saranac Lake, passes through its central portion. The land includes all, or parts, of Lots 105, 106, 93, 63, 62 and 64 of Township 21, Macomb's Purchase, Franklin County, as shown on the large Adirondack map published by the Commission.

Early last spring, as soon as the ground was free from snow, a careful examination of this territory was made by Commissioner Middleton and the Superintendent of Forests with reference to the feasibility of undertaking reforesting operations there. The only objection noted at the time was the proximity of the railroad, which would form a constant source of danger from fire. This difficulty was offset to a considerable extent by the fact that a district fire-warden resided close by, and that a number of people living in the immediate vicinity were always available as a force for fighting fire.

Having decided to undertake the planting of about 700 acres of this tract the question naturally arose as to the species which should be used. The White Pine is the most available of our forest trees, and, as it had originally covered this ground with a natural growth, preference was given to this species. The selection was further



PLANTING AN OLD BEAVER MEADOW NEAR LAKE CLEAR JUNCTION. C. R. Pettis, photo.
A stack of wild hay appears at the right, near the brook.



WAWBEEK NURSERY—STATE COLLEGE OF FORESTRY. J. F. Clark, photo.

Taking up four-year-old White Pine transplants for shipment to the plantation at Lake Clear.

indicated by the sandy soil which elsewhere throughout the Adirondacks is generally found in connection with this famous tree. But, as white pine seedlings sufficient to cover the entire area could not be obtained at a satisfactory price other species would have to be used. Preference was accordingly given to spruce as the next best; and as none of the nurseries in this country or abroad had done anything in the way of propagating our native spruce recourse was had to the Norway Spruce, a species which has been grown successfully in European forests as a timber tree, and has also been raised extensively in American nurseries for park or lawn purposes.

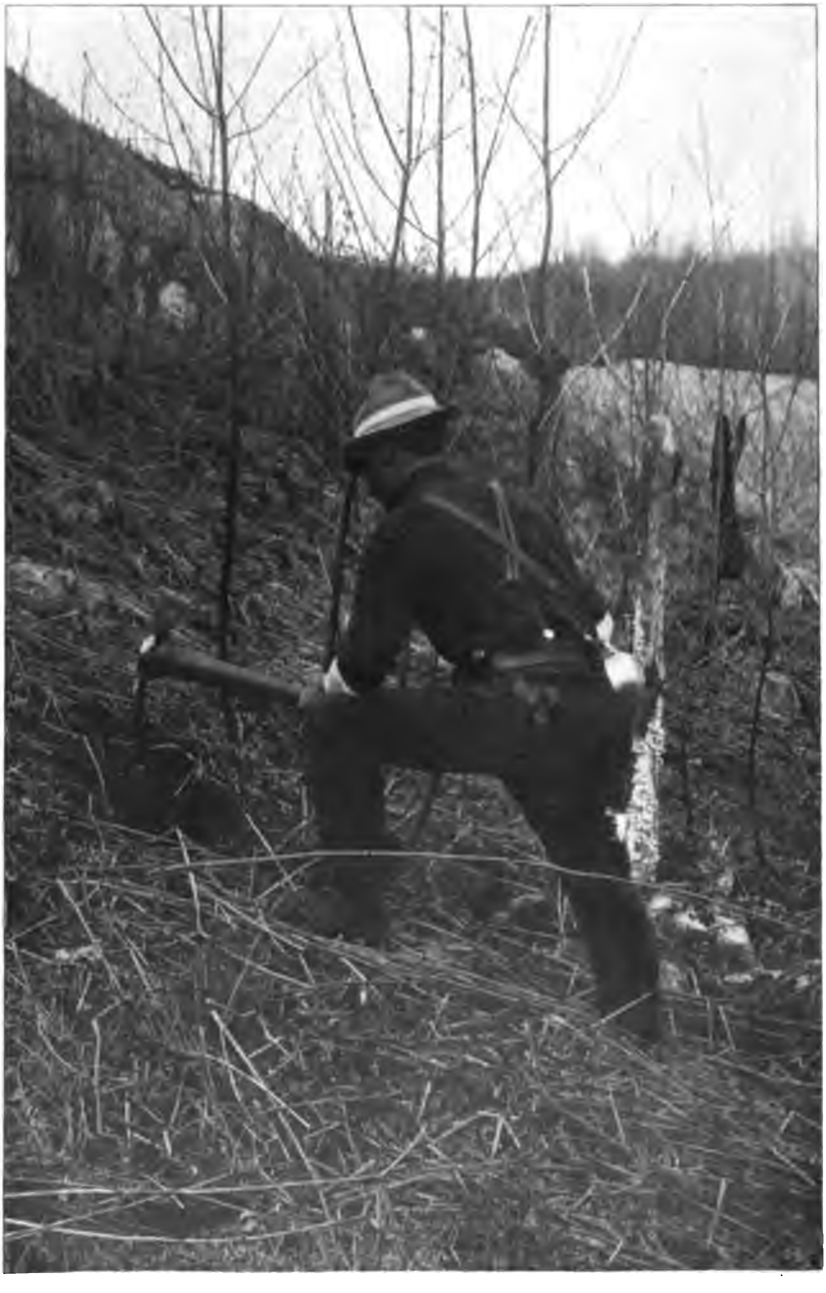
The Axton nurseries, operated by the State College of Forestry, having offered a stock of seedlings at a low price an order was given at the following rates:

50,000	White Pine transplants, 4 years old, at $6.25...	$312 50
10,000	White Pine seedlings, 2 years old, at $5.......	50 00
40,000	Scotch Pine transplants, 3 years old, at $4.....	160 00
10,000	Scotch Pine seedlings, 2 years old, at $3.......	30 00
50,000	Norway Spruce transplants, 3 years old, at $4..	200 00
200,000	Norway Spruce seedlings, 2 years old, at $1.50.	300 00
25,000	Douglas Fir seedlings, 2 years old, at $5......	125 00
30,000	European Larch seedlings, 2 years old, at $2...	60 00
5,000	Black Locust seedlings, 2 years old, at $1.....	5 00
		$1,242 50

The white pine transplants, 4 years old, were from 10 to 12 inches in height; the seedlings, 2 years old, ranged from 4 to 6 inches. The small quantity of Larch, or Tamarack as it is called in this country, was ordered for experimental purposes, these plants being used principally where the ground was low and wet; for this species finds its habitat, as a general rule, in swampy land, although at some places in the Adirondacks it has attained a thrifty growth on a high, dry situation. The Locust was also ordered for experimental work. The plants were hauled in wagons from Axton to the planting ground, a distance of seventeen miles, at a cost of $106.50, not including the board of the men and teams employed on this part of the job.

The work of setting out the little trees, together with the general management, was entrusted to Abraham Knechtel, F. E., assisted by Mr. Clifford R. Pettis, F. E., who attended to the alignment of the rows, acted as timekeeper, and who has had charge of the plantation since. Mr. Ernest A. Sterling, F. E., also on the staff of the State Forestry Department, at that time, remained at Axton where he prepared the plants for shipment and verified the count. The planting was commenced on April 22d and was completed May 13th, during which period over half a million of young trees were set out. From 40 to 62 men were employed daily on the work. The weather was cool and cloudy with an occasional flurry of snow, conditions that on the whole were deemed favorable. The plants were placed in rows, at spaces six feet apart each way, a somewhat crowded condition being sought in order to facilitate the proper shedding of the lower limbs in time, and to promote the necessary growth in height. This spacing was adopted with reference to a thinning 15 to 18 years hence, at which time the trees should be from 16 to 20 feet high. The thinnings can then be sold for pulpwood or fuel; and it is expected that the revenue from this source will offset the expense of the plantation up to that time.

The advantages of a plantation composed of mixed species as compared with one containing a pure stand were fully discussed, preference being given to the former, more especially for white pine



MAKING THE HOLE FOR A PLANT. C. R. Pettis, photo.

PLANTING A SEEDLING TREE.

C. R. Pettis, photo.

and larch which, on account of their habit of open growth, expose the soil to the drying influences of sun and wind, and which when grown in pure stand do not readily shed their lower branches. These were mixed with Norway spruce, only a small area of each being planted unmixed for comparison.

In setting out the plants the men were divided into two gangs, one of which was provided with mattocks for digging the holes, while the other carried pails filled with the seedlings, the roots of which were immersed in thick muddy water. The men were formed in two parallel lines, the mattock men in the front line six feet apart, closely followed by the second line which was composed of the planters with their pails of seedlings.

Three or four strokes of a mattock* were enough to make a shallow hole in the sandy soil of sufficient depth for a seedling tree. The planter, who in each case followed a mattock man, dropped on his knees at each hole, and taking a plant from his pail placed it quickly in the ground, packing the loose earth closely around the roots with his hands, after which he packed it still more firmly with his foot before going to the next place. With the work thus systematically arranged, the two lines of men moved across the fields at an even pace, covering the ground at a rate that was extremely satisfactory. As the planters, in order to keep up with the mattock men, had the hardest task, the gangs changed off in their work after each crossing of a field, the planters then digging the holes and the mattock men carrying the pails.

As this was State work the men labored only eight hours a day, in accordance with the provision of the Labor Law regulating the hours on public works. The laborers received $1.50 per day, while the foremen, of whom there were three, were paid $2 per day. Ordinarily, men cannot be obtained in the Adirondacks at these wages; but the work was done at a season of the year when there is little doing in the lumber regions or on the farms, a fact which should be remembered when discussing the relative advantages of spring and fall planting.

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*The Commission imported a supply of Wurtemburg planting irons from Germany for use on this plantation; but for general work a mattock or grub hoe (single blade) proved more satisfactory than the heavier German implement.

On favorable ground, when free from interruption by bad weather or other causes, two men, a mattock man and his planter, set out about 1,600 plants in eight hours, or one day's work. But this average was not sustained during the entire course of the planting. It required 747 days' labor—including foremen, laborers, and water boys—to set out the 500,000 seedlings provided, or 669 plants per day for each man and boy on the job. The total expense of the plantation, including purchase price of seedlings, cartage on same, and labor, amounted to $2,496.22, or less than half a cent per plant.

The large gang of laborers employed obtained board and lodging at houses in the immediate vicinity of Lake Clear Junction, or near Lots 105 and 106, the first ones planted. But when the work extended to the lots farther south it was found that too much time was consumed in walking to the ground each morning and in returning at night. Forester Knechtel then made a written application to Mr. F. A. Harrington, Division Superintendent of the New York Central Railroad, asking for transportation for the men to and from their work, whereupon Mr. Harrington kindly ordered that free transportation be furnished on the railroad, and that the passenger trains on the Saranac Lake branch should stop morning and evening to let off or take on the planting gang at whatever points on the line might be most convenient for the work.

The seedlings having been set out at intervals of six feet there were 1,210 plants per acre; and hence the ground actually occupied by the half million seedlings includes only 414 acres. But owing to frequent obstructions, swampy places, and thickets of sapling trees, the boundaries of the territory planted embrace nearly 700 acres.

The thick growth of ferns which covered the ground, and could not be removed except at too great an expense, caused some apprehension through fear that it might choke the young plants or seriously retard their growth. But nothing of the kind occurred, and the little trees grew thriftily among the overshadowing brakes, which, in fact, proved valuable as a protection against the heat of the sun in July and August.

Mixed with the ferns was an abundant growth of huckleberries that furnished another cause for anxiety when the picking time came, lest the young trees, hidden from view by the ferns and bushes, might be trampled and killed by the people who thronged the adjoining plains while gathering the fruit. As the plantation was on public land, unfenced, some plan had to be devised for keeping the berry pickers off the ground. To this end Forester Pettis with two laborers, using short scythes or bush-hooks, went over the planted territory and cut off the tops of the huckleberry bushes before the fruit was ripe. As a result of this simple expedient the berry pickers went elsewhere, and the plantation was not injured by them.

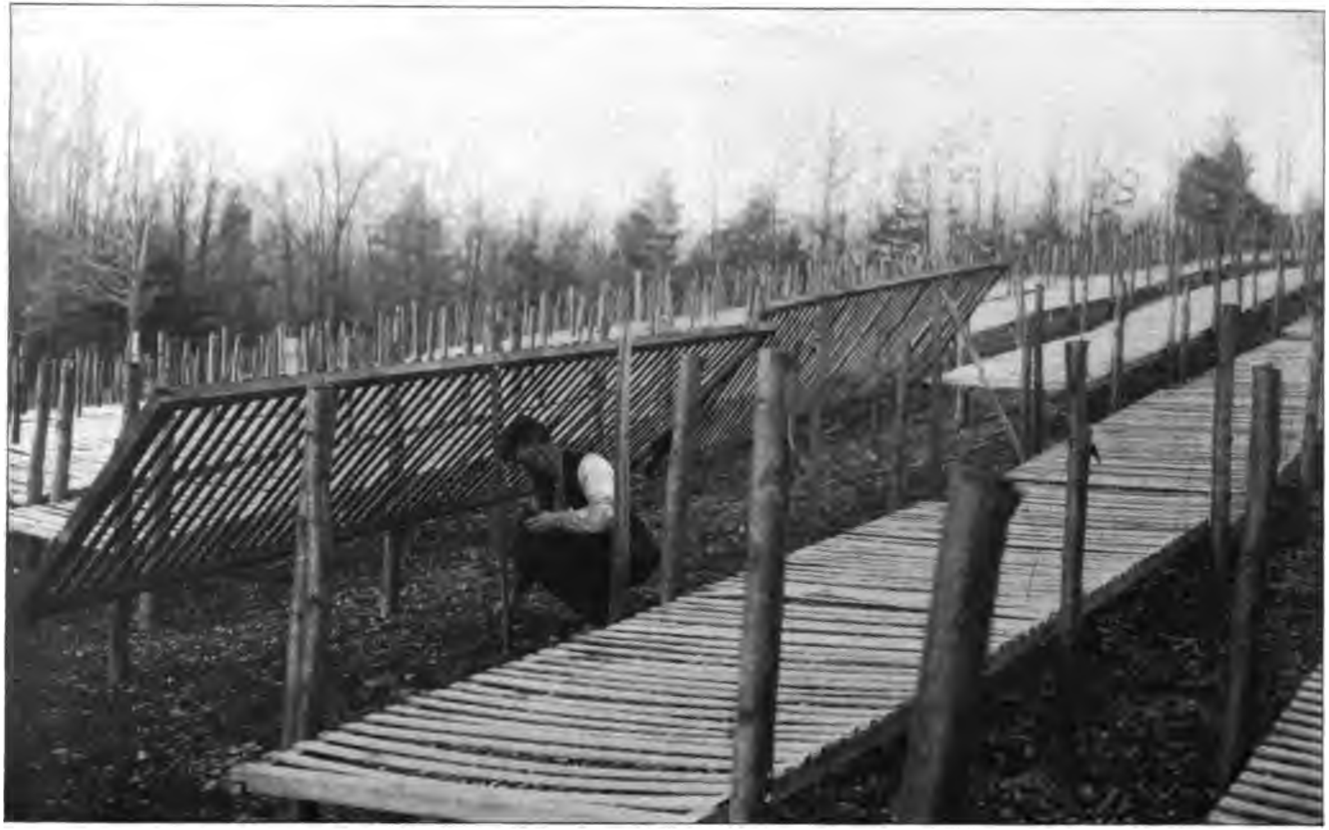
So far as can be observed the condition of the plantation at the present time is very encouraging. Of the half million plants set out the percentage of loss was astonishingly small—far below the number expected as based on the usual percentage of failures given in tables published by various authorities. It was only after a long and careful search that a dead plant could be found. Most of the seedlings showed a rapid growth also, the leaders on the White Pine attaining a length of from 4 to 10 inches during the summer following the planting. The Forestry Committee of the State Legislature, Hon. Thomas M. Costello, Chairman, while on its annual tour of inspection in the Adirondack Preserve visited the plantation last August in company with Commissioner Babcock, and each member of the Committee expressed himself as highly pleased and satisfied with the appearance of the work.

For several years to come, in early spring or late fall, there will be some danger from locomotive sparks, which may start fires in the dead leaves on the ground and spread into the plantation. But this evil can be minimized greatly by employing one or two patrols during the few months in which there is a liability to loss from this source. Last spring a fire, caused by a locomotive, started in the immediate vicinity of a planted area while the men were at work there. Driven by a high wind it quickly assumed a threatening aspect; but the forester in charge of the planting immediately detailed a gang of men to fight it, and it was extinguished before any damage was done.

The planting having been completed Forester Pettis was directed to make a topographical survey of the lots included in the work, using contours of ten feet. I submit herewith the map made by him in connection with this survey, on which the area occupied by each species is indicated by the special color designated in the legend.

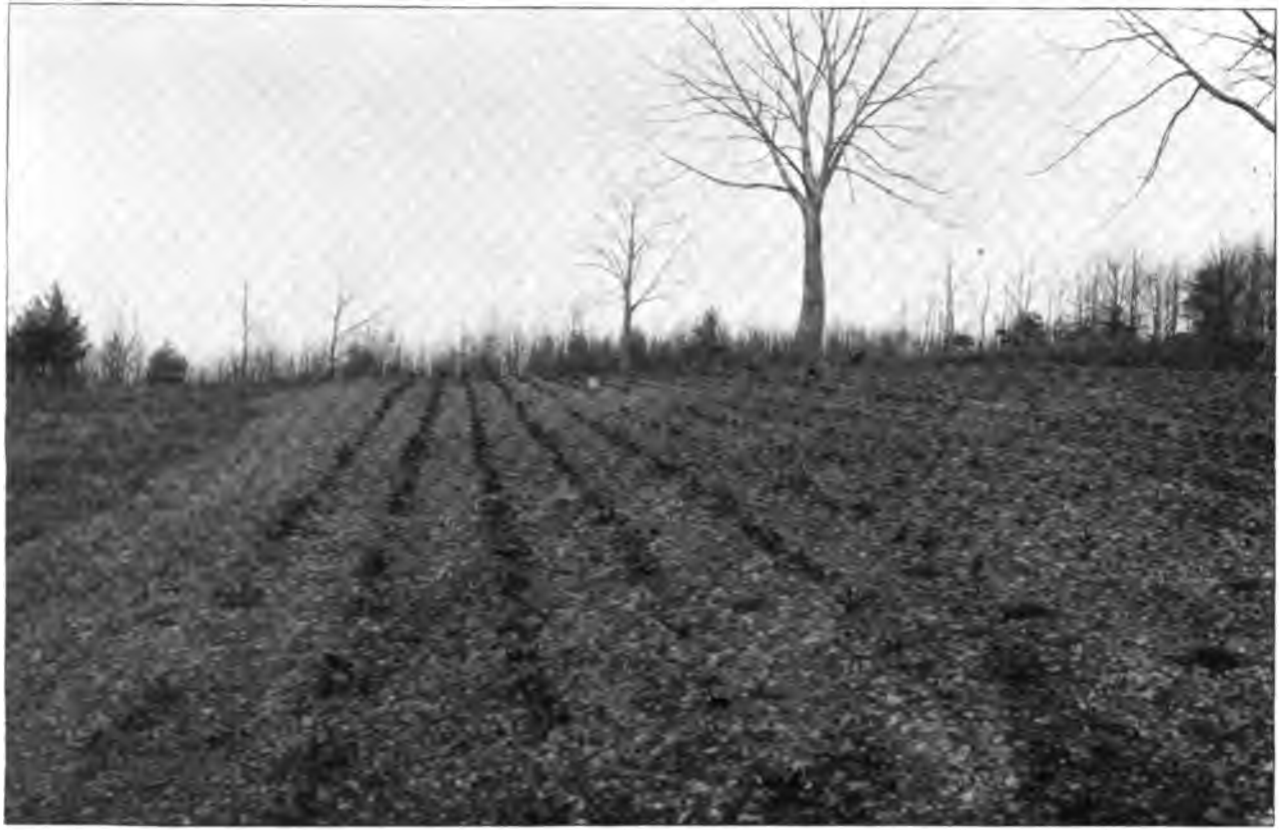
FOREST NURSERIES.

If the Commission is to continue its work of reforesting the denuded lands of the State Preserve there will be some difficulty in obtaining a sufficient quantity of seedlings for the annual plantings. It is doubtful whether the desired species can be procured in sufficient quantities. Assuming that the plants are obtainable, the current rates quoted in the price lists of the nurserymen indicate that the expense would make reforesting operations too costly or unprof-



CATSKILL STATE NURSERY. A. Knechtel, photo.

Frames for shading seed beds. Posts, to which wires are attached, are for raising the frames to give more light and air when necessary, and to facilitate weeding.



CATSKILL STATE NURSERY. A. Knechtel, photo.

Oaks and Chestnuts. Seed planted in May. Photographed in October, same year.

itable. This difficulty can be successfully obviated by establishing State nurseries in which our foresters can propagate seedlings to furnish annually the necessary supply. Availing itself of its ownership of the land, and the expert services of its foresters, the Commission can provide a stock of seedlings at a comparatively small expense.

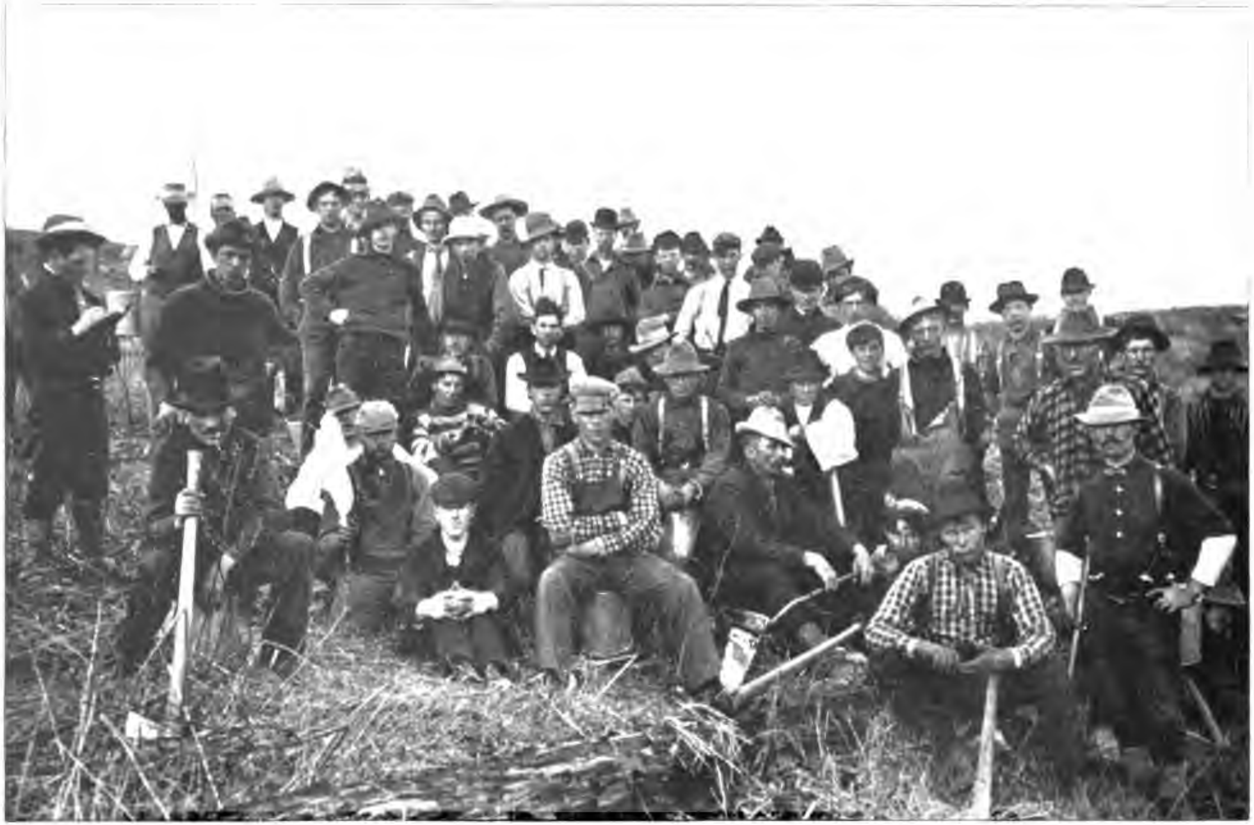
To this end a nursery has been established in the Catskills, at a location in Ulster County about one mile south of Brown's Station, on the Ulster and Delaware Railroad. After a careful examination of various pieces of land in that vicinity, suitable for nursery purposes, a selection was made of about four acres situated on the farm of Egbert Dederick, located as just described. The ground was prepared early last spring, ploughed, harrowed, picked free of stone, and laid out into beds 4 feet by 20, which were planted with the seeds of White Pine, Scotch Pine, Norway Spruce, and European Larch. Some planting was also done in rows, in which were used the seeds of Chestnut, Black Walnut, Red Oak, Pin Oak, and Basswood. The soil is a clayey loam, somewhat gravelly. The land slopes to the northwest, and is partially protected from unfavorable winds by a belt of woods close by. A northwestern exposure may seem, at first thought, to be an unfavorable condition; but it has this advantage,—that the plants will not thaw out too quickly after a late frost in the spring.

As most of the reforesting operations conducted by the Commission will be carried on in the Adirondack Preserve a site for another and larger nursery was selected in Franklin County, at Saranac Inn Station. Here there is an open field of about seven acres immediately adjoining the State Hatchery at that place, and sheltered on all sides by a standing forest. The soil is a sandy loam, which, under proper treatment, is best adapted to the growth of the coniferous species to be propagated there.

This nursery will have a capacity of 3,000,000 seedlings and transplants, and in time will furnish the entire stock necessary for the reforesting work of the Commission in the Adirondacks. Its close proximity to the railroad station will save considerable expense in the transportation of seedlings, while the employees at the State Hatchery will at all times furnish protection in case of fire. The location is an ideal one, and no other place in the Adirondacks can be found that will so completely satisfy all the requirements. Work was commenced on the ground this fall, two teams and five men being employed in ploughing and preparing the soil. Next spring it will be laid out in beds, 4 feet by 20, in which will be planted seeds of White Pine and the native Adirondack Spruce, together with such other species as may be deemed advisable for experimental purposes.

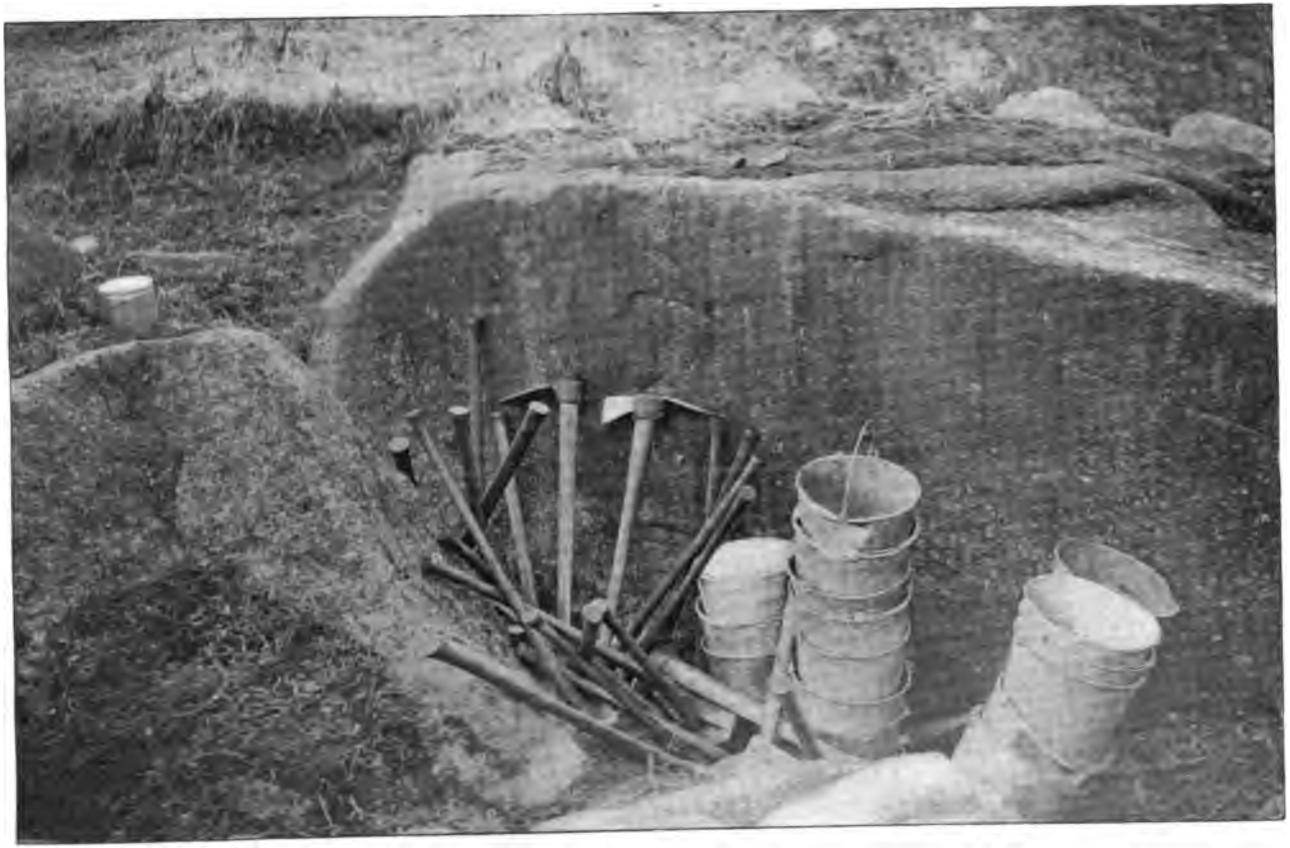
The operation of this nursery will be dependent on a small annual appropriation by the Legislature—say $450 or thereabouts. An additional sum may also be necessary when it is well started to provide for a fence and for a small house in which there should be a sleeping room for the forester in charge, and a loft where the supply of seeds can be prepared and safely stored. A tool shed will also form a convenient addition to the building.

The Legislature at its last session appropriated the sum of $4,000 for undertaking reforesting operations and other work incidental thereto. Of this sum $2,496.22 were expended in the purchase of seedlings and for labor in setting them out on the Lake Clear plantation; and $706.37 was paid out in establishing the Catskill nursery. The latter amount included $92.65, paid to J. M. Thorburn & Co., New York city, for seeds. The balance of the appropriation will be available for the preliminary work at the Saranac nursery.



CALLING THE ROLL.

A. Knechtel, photo.



A. Knechtel, photo.

THE "TOOL HOUSE."

Instead of purchasing seed for its nurseries the Commission intends to obtain a supply from our native forests. Fresh, live seed will thus be secured, and the foresters in collecting it will have a good opportunity to familiarize themselves with that important branch of silvicultural work. As 1902 was not a seed year for the White Pine we were unable to collect any this fall, and so will have to purchase seed of this species for our nursery work next spring. An effort was made to find seed cones of the White Pine in the Adirondacks, and Forester Knechtel made a trip to the Ontario forests for the same purpose, but without success in either locality.

Last season, however, was a seed year for the Adirondack Spruce, and so Forester Pettis, with the aid of a few laborers, collected a supply of cones which yielded ten bushels of these tiny seeds. Part of this supply will be used in the beds of the Saranac nursery next spring; the rest will be available for some broadcast sowing on denuded lands, and, also, for free distribution in small quantities to any of our citizens who may wish to start small nurseries for forestry purposes, or raise spruce trees direct from the seed without transplanting.

As the details connected with the work of gathering spruce cones and extracting the seed may be interesting to people who desire information as to the method employed, I append a report made by Mr. Pettis in which it is fully described.

PRESENT AREA OF THE FOREST PRESERVE.

During the past year there has been some increase in the acreage of the Forest Preserve through acquisitions made by the tax sales of 1900, for which the period of redemption expired just before January 1, 1902; and, also, by purchases made under the last appropriation granted for that purpose. This appropriation was made in 1900, but owing to delay in perfecting the titles several tracts were not conveyed until after January 1, 1902, and hence they were not included in our printed land list or in the statement of acreage published in the report sent to the Legislature one year ago. The acreage as stated at that time was:

ADIRONDACK PRESERVE.*

Counties.	*Acres.*
Clinton	20,105
Essex	231,764
Franklin	159,633
Fulton	21,426
Hamilton	578,340
Herkimer	146,733
Lewis	4,530
Oneida	6,637
St. Lawrence	34,683
Saratoga	11,588
Warren	108,283
Washington	2,129
	1,325,851

CATSKILL PRESERVE.

Delaware	12,936
Greene	4,269
Sullivan	888
Ulster	64,237
	82,330

Summary.

Adirondack Preserve	1,325,851
Catskill Preserve	82,330
Total Forest Preserve	1,408,181

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*To prevent confusion in the use of terms it is well to remember that the Adirondack Preserve includes the State lands outside the Adirondack Park as well as the lands within the Park boundaries.

To this total must be added the acreage acquired in 1902, which is as follows:

	Acres.
Tax sale of 1900	15,513
Purchases in 1902	13,150
	28,663
Less redemptions	158
	28,505

Adding the latter amount to the acreage reported one year ago the total acreage of the Forest Preserve on January 1, 1903, will be 1,436,686 acres.

Although the time for redemption of non-resident lands from the tax sale of 1900 expired in December, 1901, certain other lands, on which there may be a so-called occupancy, are entitled to a longer period of grace and may be redeemed at any time within the six months following the service of the Comptroller's notice on the occupants. As the agents of the Comptroller served these notices last September and October the title of the State to these parcels cannot be perfected until April, 1903, or thereabouts, the exact time varying with each lot according to the date when the agent filed his return, or affidavit of notice, in the office of the Comptroller at Albany. This leaves the exact acreage of the Forest Preserve somewhat in doubt just now, as there will still be numerous redemptions made under this provision of the law, amounting, perhaps, to two thousand acres or more.

The total acreage just shown does not include the State lands in the towns of Altona and Dannemora, Clinton County, which are excepted in the law defining the Forest Preserve. These tracts, which were reserved for the use of the Dannemora Prison, contain 14,347 acres, and should be included in the Forest Preserve, even if the amendment making the necessary transfer contain some proviso that the care and custody of these forests shall remain in the Prison Department. The lands in the International Park, situated on the St. Lawrence River, in Jefferson and St. Lawrence Counties, are also omitted in computing the area of the Forest Preserve, although this property is placed by law under the care and management of the Forest Commission.

In my report one year ago I submitted a tabulation showing the classified acreage of the Adirondack Park, as based on the returns of Foresters Bryant and Williams, who made a personal examination of all the townships included within the park. (See pamphlet containing Seventh Annual Report of the Commission, January 30, 1902). But within the past year the lumbermen and pulpwood operators have cut and removed 501,765,565 feet of spruce, pine, balsam and hemlock, four-fifths of which or more came from the forests within the " Blue Line " or park boundaries. Some of this output was obtained also by a third cutting on park lands that were previously classified as lumbered. No supplemental work was undertaken to determine the area of virgin forest cut over last year, but it may be safely estimated at 70,000 acres. With the former tabulation revised accordingly we have for the classification at this date the following statement:

CLASSIFIED ACREAGE OF THE ADIRONDACK PARK.

January 1, 1903.

Class.	State.	Private preserves.	Individuals or companies.	Total.
Forest	455,415	257,186	375,453	1,088,054
Lumbered	592,630	368,115	780,394	1,741,139
Waste	10,275	22,483	15,793	48,551
Burned	14,617	5,301	23,247	43,165

Class.	State.	Private preserves.	Individuals or companies.	Total.
Denuded	15,739	13,555	27,388	56,682
Wild meadows	9,961	380	12,188	22,529
Improved	4,642	6,239	90,099	100,980
Water	60,135	32,655	32,254	125,044
Totals	1,163,414	705,914	1,356,816	3,226,144

The term "Lumbered" as used here is intended to include lands that are not covered with virgin forest, and from which the lumbermen have removed the merchantable spruce, balsam, pine and hemlock, leaving the hardwood trees, which, as a general thing throughout the Adirondacks, constitute from 60 to 70 per cent of the forest. But it was difficult for the foresters to classify these lands exactly in every case, for on some tracts there was a sparse growth of small spruce and balsam that was available for a second or third cutting of young trees suitable for pulpwood. Hence it is not claimed that the classification, so far as it relates to lumbered land, is strictly accurate or definite. Much of the land thus described will still yield from one to three cords per acre of pulpwood, while here and there may be found small clumps of large spruces which were not cut by the lumbermen, because the unfavorable location of these trees made their removal unprofitable at that time.

PRIVATE PRESERVES.

In the Adirondack region there are sixty preserves, with an aggregate acreage of 791,208 acres held as private property by sportsmen's clubs or individuals. The boundaries of each preserve are posted at intervals of forty rods with printed notices warning people that it is private land on which no trespassing, fishing or hunting will be permitted, the posting of such notices being required by the law authorizing the establishment of private parks or preserves. The club or individual is not necessarily the owner of the property:

in some instances the land thus occupied and posted is leased, the exclusive fishing, hunting and camping privilege having been obtained through some such arrangement with the lumber company or person in whom the title is vested. Some of these preserves are situated, partly or wholly, outside the Adirondack Park, and hence the acreage just mentioned exceeds that given in the table showing the classification of lands *within* the park.

Throughout all the private preserves the land is well wooded, and each contains some lake, pond or fishing stream. The forest on some of these holdings is a primeval one, untouched by axe or fire. On several of the larger preserves the owners are conducting lumbering operations; but as the cutting is done under a conservative, intelligent management, and is restricted to soft wood species of medium diameter, a large revenue is derived from the property without impairing its capacity for future production. Then again there are clubs which own large tracts that have been lumbered; but as the logging was done fifteen years ago or more, at a time when the lumbermen took the large timber of one species only, these forests retain much of their primitive condition.

The private preserves in the Adirondacks, with a slight exception, have been established within the last sixteen years,—most of them within eleven years,—and the comparatively sudden exclusion of the public from its old camping grounds has provoked a bitter hostility on the part of the hunters, fishermen and guides who formerly ranged over this territory. The sportsman who returns to some favorite haunt only to find himself confronted with the words "No Thoroughfare" turns back with a resentful feeling, while the guides who were wont to conduct their patrons wherever game was plentiful, view with threatening looks the hired gamekeepers that guard the forbidden lands.

On the other hand the owners of the preserves point to the protection of the forests, fish and game afforded by them, and to the large number of guides and woodsmen to whom they furnish constant and lucrative employment. In 1899, the dry season in which forest fires were raging in the Adirondacks to an unusual extent, it was noticed that there were no fires on the private preserves, aside from incipient ones that were extinguished before any serious danger was incurred. This was due to the large number of forest patrols employed by the owners of these tracts.

It is not necessary that the State should purchase these private holdings in order that the tree growth may be protected; for the owners can be relied upon to preserve the forest conditions that are so essential to the enjoyment of their property. The acquisition of these high-priced lands may be safely deferred until the rest of the Adirondack Park has been bought. But the tenure of title to these private preserves is not permanent like that of the State Preserve; these properties change hands frequently; public sentiment is always gratified when any of this territory is opened to the people; and so it would be well if the State kept a fund on hand, available at all times for the purchase of such tracts whenever any portion is thrown upon the market.

The ownership and acreage of the various preserves is as follows:

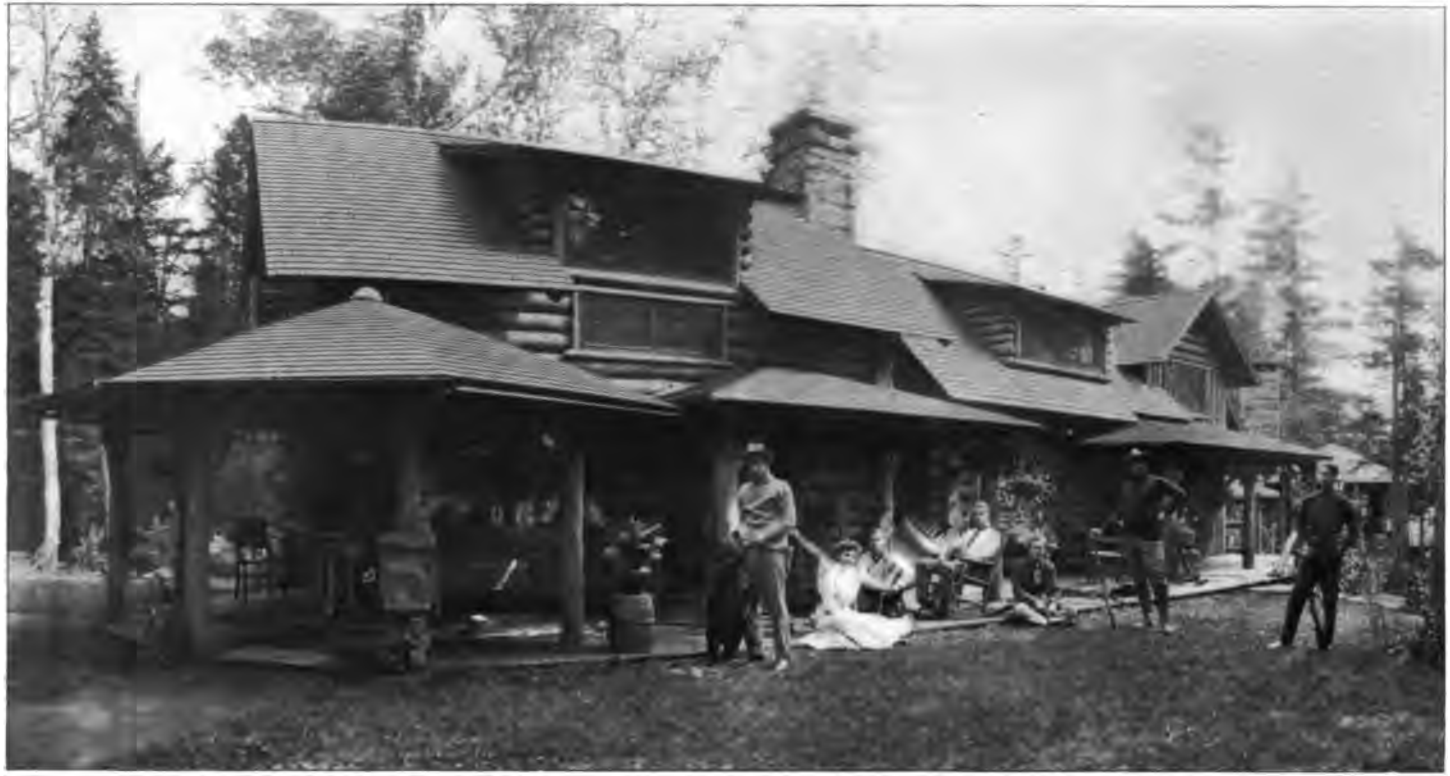
ADIRONDACK PRIVATE PRESERVES.

	Acres.
Adirondack Club.—McIntyre Iron Co., owner. Townships 45, 46 and 47, gores east and west of Township 47, and part of Township 27, Totten and Crossfield Purchase, in the western part of Essex county. Includes the largest portion of Mounts Marcy, Colden and McIntyre, and all of Mounts Santanoni, Henderson, Redfield, Allen and Adams, with Lakes Sanford, Henderson, Colden, Avalanche and Harkness........................	59,300

	Acres.
Adirondack League Club.—Hon. Warren Higley, President. Townships 1, 2, 6, and part of 7, Moose River Tract, in the counties of Hamilton and Herkimer. Embraces twenty lakes and ponds, including Honnedaga, Little Moose and Woodhull Lakes	79,172
Adirondack Mountain Reserve.—William G. Neilson, President. Township 48, Totten and Crossfield Purchase, in the central part of Essex county; part of the Roaring Brook Tract, and Lot 68 of Townships 1 and 2, Old Military Tract. The boundary lines cross the summits of Mounts Marcy and Dix. The high mountains known as Noon Mark, The Gothics, and Haystack are within its boundaries, as are also the two Ausable Lakes	25,912
Adirondack Forestry Association.—Gen. Hazard Stevens, Oscar B. Ireland and George E. Terry, Trustees. Part of Township 22, Totten and Crossfield Purchase, in the northern part of Hamilton County. Is near Long Lake, a part of the land adjoining the same	4,358
Altamont Club.—Union Bag and Paper Co., owners. Northern part of Township 8, Moose River Tract, in the western part of Hamilton County. Contains the Middle and West Canada and some other lakes. Altitude, 2,348 feet above tide	4,595
Ampersand Preserve.—Santa Clara Lumber Co., owners. Part of Township 27, Great Tract 1, Macomb's Purchase, Franklin County. Mount Seward with several lakes and ponds are on this property	32,407
Anthony Ponds.—Harper Brothers, owners. Part of Township 22, Totten and Crossfield Purchase, in the northern part of Hamilton County	7,221

	Acres.
Bog Lake Camp.—Charles A. Tatum and Edmund C. Converse, owners. Part of Township 37, Totten and Crossfield Purchase, in the northern part of Hamilton County. Contains Bog Lake and Clear Pond	5,618
Brandreth Park.—Franklin Brandreth, Ralph Brandreth and Gen. E. A. McAlpin. owners. Township 39, and part of 42, Totten and Crossfield Purchase, in northern parts of the counties of Hamilton and Herkimer. Contains the headwaters of Raquette, Beaver and Moose Rivers, Brandreth Lake, and several smaller lakes or ponds	27,298
Camp Arbutus.—Archer M. Huntington, owner. Parts of Townships 27 and 28, Totten and Crossfield Purchase, in the western part of Essex County. Lake Arbutus (Ockerman Pond) is on this preserve	1,699
Childwold Park.—Henry G. Dorr et al., owners. Part of Township 6, Great Tract 2, Macomb's Purchase, in the southeastern part of St. Lawrence County. Includes Lake Massawepie	13,090
Caughnawaga Club.—William H. Clark, President. Part of Township 28, Totten and Crossfield Purchase, in the counties of Essex and Hamilton. Includes Catlin Lake.	8,838
Cutting Preserve.—Frank A. Cutting, owner. Part of Township 12, Great Tract 2, Macomb's Purchase, in the eastern part of St. Lawrence County	7,510
De Bar Mountain Park.—William Rockefeller, owner. Parts of Townships 12 and 15, Great Tract 1, Macomb's Purchase, in the central part of Franklin County. Contains De Bar Mountain and De Bar Pond (See Everton Park and Rockefeller Preserve, also)	11,675

	Acres.
Deer Lick Rapids Club.—Part of Township 4, Great Tract 2, Macomb's Purchase, in the central part of St. Lawrence County. Contains Spruce Pond and other waters......	7,500
Everton Park.—Wm. Rockefeller et al., owners. Parts of Townships 11 and 12, Great Tract 1, Macomb's Purchase, in the central part of Franklin County. Stacey Mountain is on this tract. (See De Bar Mountain Park and Rockefeller Preserve, also.)...............................	20,000
Fenton Game Preserve Association.—Leased land. Charles Fenton, Secretary. Parts of Townships 3, 4 and 5, John Brown's Tract, in the counties of Herkimer and Lewis. Contains Beaver, Francis, and several other lakes or small ponds....................................	60,000
Follensby Pond Preserve.—Titus B. and Ferris J. Meigs, owners. Parts of Townships 25 and 26, Great Tract 1, Macomb's Purchase, in the southern part of Franklin County. Contains Follensby Pond..................	4,855
Forest Park and Land Company.—Wm. W. Durant, President. Part of Township 34, Totten and Crossfield Purchase, in the central part of Hamilton County. Contains Utowana and Eagle Lakes, and adjoins Blue Mountain Lake..	4,838
"G" Lake Preserve.—E. Z. Wright and John D. Collins, owners. Part of Oxbow Tract, in the southern part of Hamilton County. Includes "G" Lake.............	480
Gránshue Club.—Charles R. Holmes, President. Part of Township 7, Great Tract 2, Macomb's Purchase, in the central part of St. Lawrence County. Contains Long Pond	8,752



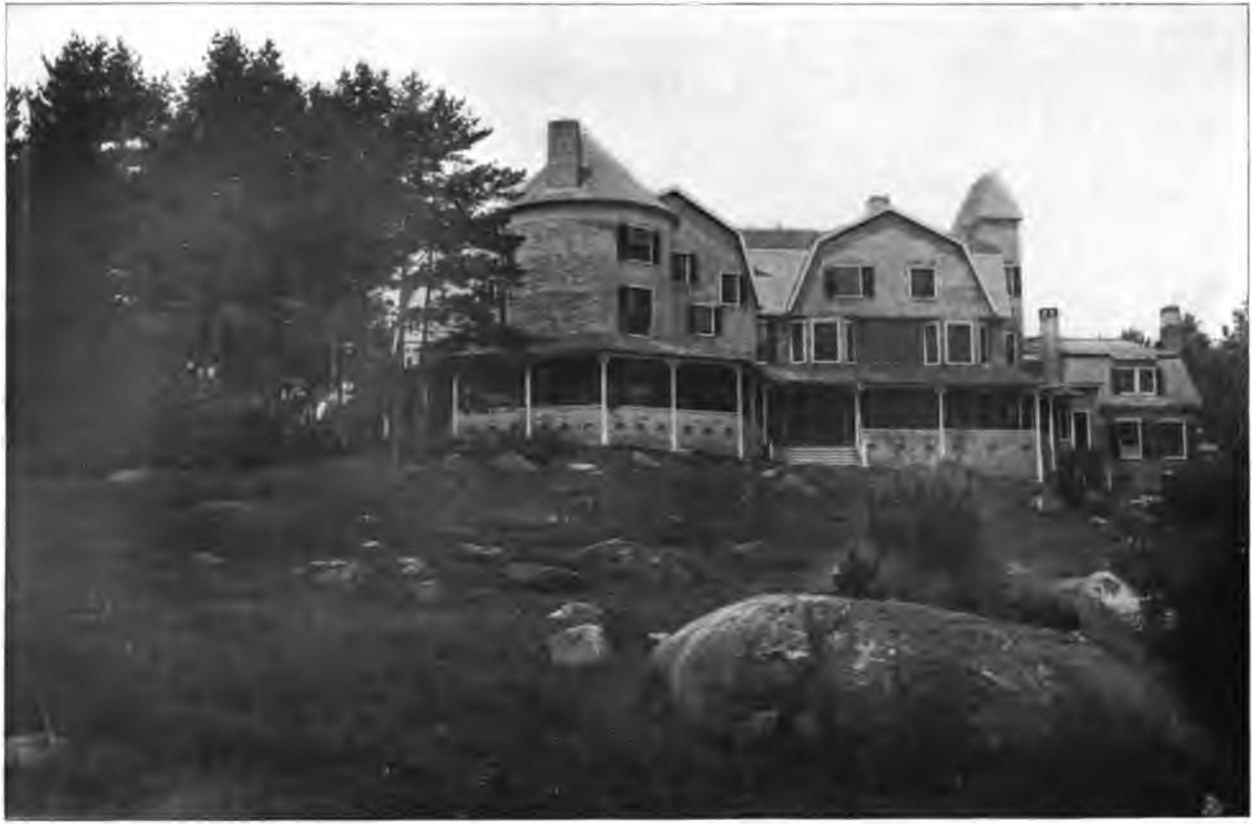
An Adirondack Camp on a Private Preserve.

	Acres.
Grasse River Outing Club.—Charles E. Brown, President. Part of Township 5, Great Tract 2, Macomb's Purchase, in the southern part of St. Lawrence County	5,520
Hamilton Park.—Hon. William C. Whitney, owner. Townships 23, 36, N. ½ of 35, parts of Township 21 and of the triangle east of Township 23, Totten and Crossfield Purchase, in the northern part of Hamilton County. Contains Little Tupper, Round, Big Salmon lakes and many other smaller lakes and ponds	71,281
Hamilton Lake Preserve.—John A. Starin, owner. Part of Township 1, Totten and Crossfield Purchase, in the central part of Hamilton County	3,202
Hollywood Club.—Dr. C. C. French, President. Part of Township 7, Great Tract 2, Macomb's Purchase, in the central part of St. Lawrence County. Includes Clear Pond	2,360
Horse Shoe Forestry Company.—Augustus A. Low. Parts of Townships 2 and 3, Great Tract 2, Macomb's Purchase, in the southern part of St. Lawrence County. Contains Horse Shoe Lake, Lake Marian, and many other lakes and ponds. The Bog River flows through this preserve	27,431
Inlet Club Preserve.—Part of Township 9, Great Tract 2, Macomb's Purchase, in the eastern part of the county of St. Lawrence. Contains Whitney Pond and other waters	6,700
Kamp Kill Kare.—Hon. Timothy L. Woodruff, owner. Parts of Townships 5 and 6, Totten and Crossfield Purchase, in the central part of Hamilton County. Contains Lake Kora, formerly Sumner Lake	1,030

	Acres.
Kildare Club.—Ehrich Brothers, owners. Part of Township 9, Great Tract 2, Macomb's Purchase, in the eastern part of St. Lawrence County. Amber and Jordan Lakes.	8,536
Knollwood Club.—Louis Marshall et al., directors. Part of Township 21, Great Tract 1, Macomb's Purchase, in the southern part of Franklin County, on the northern shore of Lower Saranac Lake	450
Lake Placid Club.—Melvil Dewey et al., owners. Lands in town of North Elba about Lake Placid and Mirror Lake.	2.148
Lake Reserves.—Dr. William Seward Webb, owner. Part of Township 8, John Brown's Tract, in the eastern part of Herkimer County. Lands about Big Moose and the Fulton Chain of Lakes. (See Nehasane Park also)	8,470
Litchfield Park.—Edward H. Litchfield, owner. Part of Township 25, Great Tract 1, Macomb's Purchase, in the southern part of Franklin County. Contains Lake Madeline (formerly Jenkins Pond), and several other bodies of water	12,427
Long Lake Preserve.—Raquette Falls Land Co., owners. Part of Township 22, Totten and Crossfield Purchase, in the northern part of Hamilton County	2,200
Lloyd Triangle.—Theodore Page et al., owners. Triangle in northwest corner of Township 41, Totten and Crossfield Purchase, comprising that portion of the township which is situated in Herkimer County. Russian Lake, Merriam and Gull Ponds	3,600
Massawepie Club.—Hon. A. P. Hepburn, owner. Part of Township 4, Great Tract 2, Macomb's Purchase, in the southern part of St. Lawrence County. Contains Brother Ponds and other waters	1,720

	Acres.
Mat-a-Mek Preserve.—Hon. Ashbel P. Fitch, owner. Parts of Townships 8 and 9, Old Military Tract, in the eastern part of Franklin County. Includes a part of Ragged Lake	1,854
Meacham Lake Preserve.—Part of Township 15, Great Tract 1, Macomb's Purchase, in the central part of Franklin County. Includes Meacham Lake and several ponds; also East Mountain	5.580
Mohegan Lake Camp.—J. Pierpont Morgan, owner. Part of Township 5, Totten and Crossfield Purchase, in the central part of Hamilton County. Contains Mohegan Lake	1,551
Moose Pond Preserve.—Hon. George R. Finch, owner. Part of Township 26, Totten and Crossfield Purchase, in the southwestern part of Essex County. Contains Moose Pond and several other bodies of water	800
Morehouse Lake Club.—W. W. Mosher, President. Part of Arthurboro Patent, in the southwestern part of Hamilton County. Contains Morehouse Lake	1,500
Nehasane Park.—Dr. William Seward Webb, President. Parts of Townships 37, 38, 42 and 43, Totten and Crossfield Purchase, in the northern parts of the counties of Hamilton and Herkimer. Contains Lake Lila, Nehasane Lake, and several other bodies of water, large and small	42,848
North Woods Club.—James Yalden, Secretary. Part of Township 16, Totten and Crossfield Purchase, in the southwestern part of Essex County. Mink Lake and several other ponds are on this property	4,583

	Acres.
Paul Smith's Preserve.—Paul Smith's Hotel Co., owners. Parts of Townships 18 and 21, Great Tract 1, Macomb's Purchase, in the southern part of Franklin County. Contains the St. Regis Lakes, Osgood Pond and other waters	18,484
Pine Lake Club.—Watson T. Dunmore, President. Part of Arthurboro Patent, in the southwestern part of Hamilton County. Contains Pine and Snowshoe Lakes........	987
Pleasant Lake Club.—Thos. H. Wagstaff, President. Part of Glen, Bleecker and Lansing Patent, in the northwestern part of Fulton County. Contains Pleasant Lake...	1,000
Pleasant Lake Preserve.—Part of Township 7, Great Tract 2, Macomb's Purchase, in the central part of St. Lawrence County. Contains Pleasant Lake and Blue Mountain	8,750
Putnam Preserve.—Dr. Charles P. Putnam, owner. Parts of Roaring Brook and North River Head Tract, in the central parts of Essex County. Contains the Twin Ponds and several other small bodies of water.........	2,960
Read and Strong Park.—Part of Township 25, Great Tract 1, Macomb's Purchase, in the southern part of Franklin County. Contains Little Simon and McBride Ponds and Mount Morris	7,375
Rockefeller Preserve.—William G. Rockefeller, owner. Townships 16 and 17, Great Tract 1, Macomb's Purchase, in the central part of Franklin County. Includes Follensby Junior, Wolf, McDonald and several other ponds. (See De Bar Mountain and Everton Parks also)	52,335



J. M. Schuler, photo.

SARANAC CLUB HOUSE.

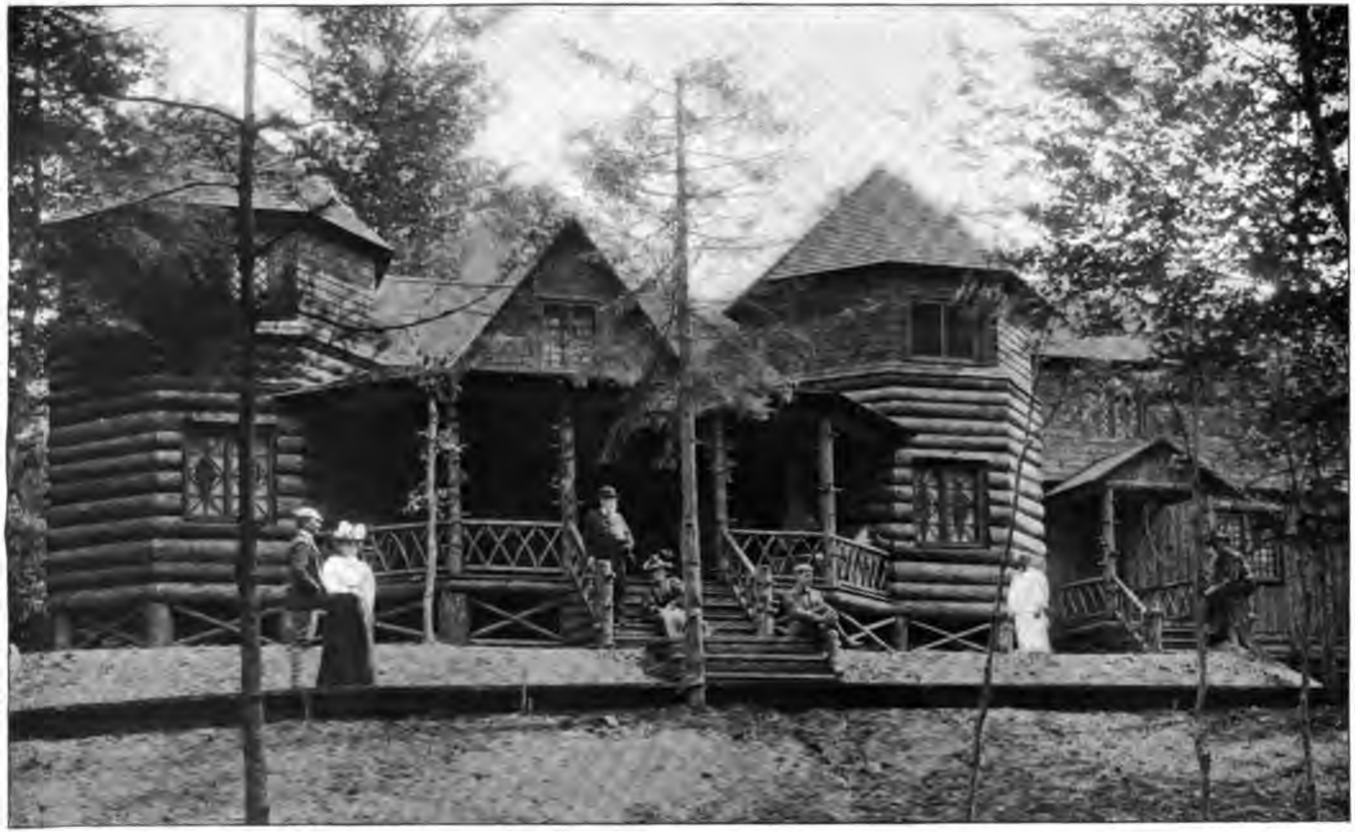
On the old Bartlett Carry, Upper Saranac Lake.

	Acres.
Sabattis Park.—Charles R. Christy, owner. Part of Township 37, Totten and Crossfield Purchase, in the northern part of Hamilton County. Includes Bear Pond and some other small bodies of water....................	1,633
Sagamore Park.—Alfred G. Vanderbilt, owner. Part of Township 6, Totten and Crossfield Purchase, in the central part of Hamilton County. Includes Lake Sagamore (formerly Shedd Lake).........................	1,530
Santanoni Park.—Hon. Robert C. Pruyn, owner. Part of Townships 27 and 28, Totten and Crossfield Purchase, in the western part of Essex County. Newcomb Lake and several ponds	11,205
Saranac Club.—Jonathan J. Broome, President. Part of Township 23, Great Tract 1, Macomb's Purchase, in the southern part of Franklin County, on the old Bartlett Carry, between the Upper and Middle Saranac Lakes..	267
Stillwater Club Preserve.—J. H. Rushton, Secretary. Part of Township 6, Great Tract 3, Macomb's Purchase, in central part of St. Lawrence County. Cranberry Pond and many other waters...........................	20,000
Upper Saranac Association.—Dr. Samuel B. Ward, President. Part of Township 20, Great Tract 1, Macomb's Purchase, in the southern part of Franklin County, at the north end of Upper Saranac Lake................	2,751
Vilas Preserve.—E. A. Carpenter, owner. Parts of Townships 9 and 12, Great Tract 2, Macomb's Purchase, in the eastern part of St. Lawrence County.............	18,075

	Acres.
Wilderness Park.—W. S. DeCamp, owner. Parts of Townships 1 and 7, John Brown's Tract, in the counties of Hamilton and Lewis. Contains Nick's, Blackfoot, and Gibbs Lakes, and several ponds	29,567
Wilmurt Club.—Hon. Titus Sheard, President. Park of Arthurboro Patent, in the southwestern part of Hamilton County. Includes Wilmurt Lake	1,655
Zack Lake Preserve.—Raquette Falls Land Co., owners. Part of Township 27, Totten and Crossfield Purchase, in the western part of Essex County. Zack Lake is on this preserve	1,725
Total acreage	791,208

The total area of the private preserves as given here is much less than that shown in the list published by the Forest Commission in its annual report for 1893. This decrease is due to large sales made to the State and to lumber companies. Since 1896 the State has purchased 75,000 acres of the Nehasane Park Association, 35,932 acres of the Adirondack League Club, and 30,000 acres from the owners of the Santa Clara Preserve.

In addition to the preserves mentioned in the foregoing list there is a large amount of forest property in the Adirondacks composed of small holdings—from five to one hundred acres each—on which cottages, or "camps," as they are called, have been erected. These summer residences, with their pretty boat houses and other buildings, are often located at sightly points on the lakes—particularly the Raquette, Saranacs and St. Regis—where they form a never failing source of interest to the tourist, as they represent large expenditures of money, and are models of good taste combined with solid comfort. They furnish employment at high wages for a large



Adirondack Cottage of the Late President Harrison.

number of people—" house guides," servants, and men on private launches—and contribute in various other ways to the prosperity of the region. Together with the " camps " on the larger private preserves there are at present 419 of these summer residences in the Adirondacks, costing from $5,000 to $100,000 each, in which the investment for buildings, exclusive of land, amounts in the aggregate to $3,846,500.

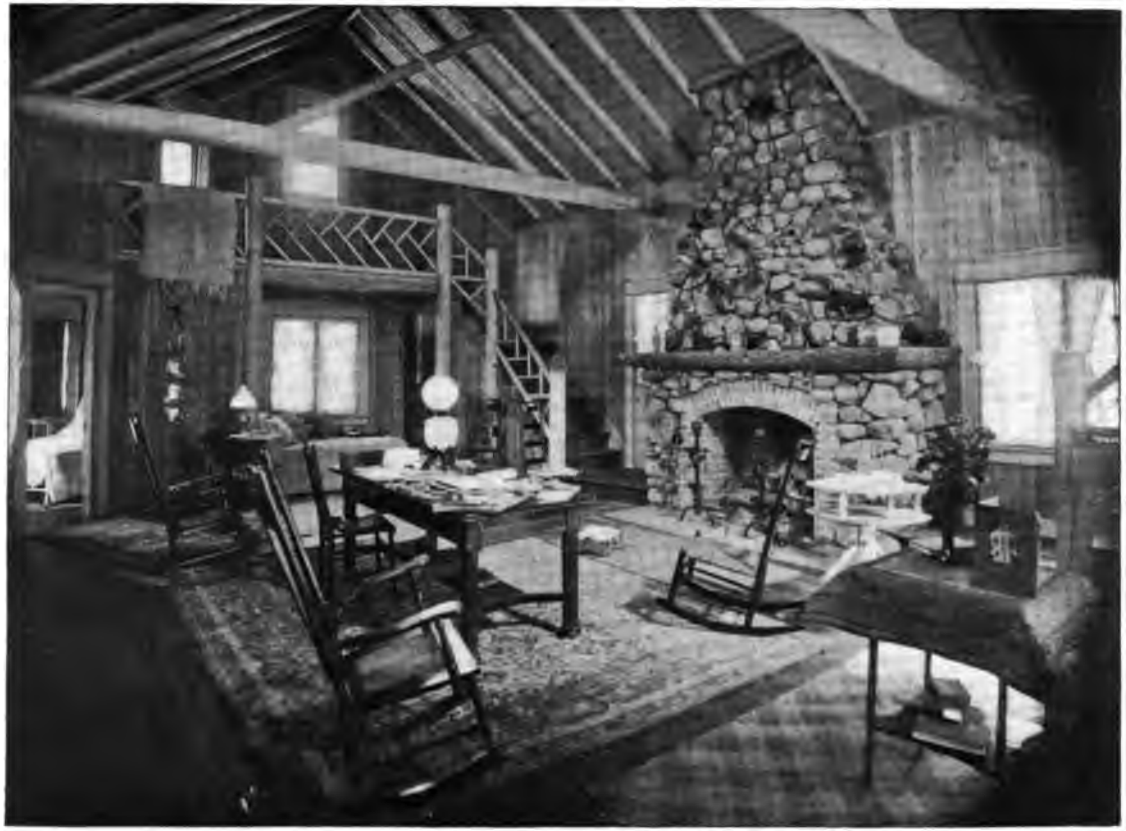
If there are any to whom these figures may appear unduly large, their attention is respectfully called to the beautiful and costly summer homes near Raquette Lake owned by Mr. J. Pierpont Morgan, Mr. Alfred G. Vanderbilt, Hon. Timothy L. Woodruff, and the late Collis P. Huntington; to the forest villas on the St. Regis Lakes of Hon. Whitelaw Reid, F. W. Vanderbilt and H. McK. Twombly; to the expensive, tasteful " camps " on Upper Saranac Lake belonging to Hon. Levi P. Morton, Isaac Seligman, the Messrs. Swenson, Mr. Julius S. Bache, Dr. L. E. Holt and Mr. D. H. Kahn; to the buildings of the Knollwood Club on Lower Saranac; the numerous fine cottages of the Adirondack League Club on Little Moose, Honnedaga, and the Bisby Lakes; the houses of the Saranac Club on the Bartlett Carry; the large number of beautiful cottages at Lake Placid and Keene Valley; and the extensive buildings on the private preserves of Hon. Robert C. Pruyn, Dr. William Seward Webb, Mr. William Rockefeller, Gen. E. A. McAlpin and Mr. A. A. Low.

ADIRONDACK SUMMER BUSINESS.

The business done each season by the hotels and boarding houses in the Adirondacks contributes largely to the development and prosperity of northern New York, fairly approaching in its magnitude that of the great industries which are dependent on the forest product of that region. In the management of this business employment is furnished to thousands of people, trade is stimulated by the large purchases of supplies, building operations increase the demand for skilled labor, while the railroad and steamboat lines reap the benefits accruing from the large passenger and freight traffic. Of more importance, however, far greater in its humane aspect than mere commercial advantages, are the sanitary benefits afforded by the Adirondack forests to the thousands who there find relief from disease and enjoy a new lease of life. The healthful climate is due largely to the pure air which, carried by mountain winds over great forest areas, is freed from dust, smoke and miasmatic influences, while in its course it is charged with balsamic exhalations that carry healing to the lungs of invalids.

The statistics published in the annual reports of the Adirondack Cottage Sanitarium show a remarkable percentage of cures effected in patients suffering from incipient consumption; and a large proportion of the population in some of the Adirondack villages is composed of people who enjoy comparatively good health in that climate, although they could not live long elsewhere. Of this class many find employment in various vocations, while others, whose incomes will permit, maintain a permanent residence there without engaging in any business or occupation.

I submit herewith a carefully prepared table showing the capacity of the hotels and boarding houses in the various localities throughout the Adirondack region, compiled from their advertisements, in which each proprietor states the number of people that can be accommodated, this advertised capacity being cut down in many instances to better suit the facts in the case. It does not include the occupants of private camps and sanitariums.



An Adirondack Interior.

ADVERTISED CAPACITY OF ADIRONDACK HOTELS AND BOARDING HOUSES.

COMPILED BY LOCALITIES.

Clinton County.

Bluff Point	40
Chateaugay Lake, Upper	385
Chazy Lake	85
Cliff Haven (Champlain Assembly)	875
Hotel Champlain	525
Redford	223
Silver Lake	20
	2,153

Essex County.

Aiden Lair	50
Ausable Forks	233
Bloomingdale	299
Blue Ridge	20
Boreas River	24
Cascade Lakes	85
Chilson Lake	55
Crown Point	237
Elizabethtown	686
Elk Lake	30
Essex	102
Jay	191
Keene Centre	65
Keene Heights	315
Keene Valley	525
Keeseville	280

Lake Placid	2,259
Lewis	54
Loch Muller	45
Minerva	65
Newcomb	55
New Russia	68
North Elba	170
North Hudson	70
Olmstedville	34
Paradox Lake	35
Port Douglas	65
Port Henry	191
Port Kent	41
Pyramid Lake	95
Ray Brook	45
Schroon Lake (See Schroon Lake, Warren County, also.)	555
Schroon River	80
South Schroon	35
Underwood	45
Wadham's Mills	49
Westport	391
Willsboro	20
Wilmington	135
	7,799

Franklin County.

Axton	15
Chateaugay Lake (Lower)	65
Duane	95
Gabriels	48

Goldsmith's	28
Harriettstown	70
Lake Clear	185
Loon Lake	385
McCollom's	45
Meacham Lake	85
Mountain View	95
Onchiota	35
Paul Smith's	475
Rainbow Lake	120
Raquette River	35
St. Regis Falls	40
Saranac Lake (Upper)	589
Saranac Lake (Middle)	85
Saranac Lake (Lower)	550
Saranac Lake Village	1,138
Spring Cove	65
Tupper Lake	188
Tupper Lake Junction	172
Vermontville	18
	4,626

Fulton County.

Canada Lakes	245
Caroga Lakes	55
Northville	75
Stratford	35
	410

Hamilton County.

Blue Mountain Lake	625
Cedar River	40
Chain Lakes, Township 18	35
Fulton Chain, Fourth Lake	295
Fulton Chain, Seventh Lake (See Fulton Chain, Herkimer County, also.)	65
Hope	30
Indian Lake	85
Indian Lake Village	35
Lake Pleasant	360
Long Lake	460
Long Lake West	35
Morehouseville	55
Piseco Lake	45
Raquette Lake	195
Wells	35
	2,395

Herkimer County.

Beaver River	80
Big Moose	355
Bisby Lakes	85
Clearwater	35
Fulton Chain (See Fulton Chain, Hamilton County, also.)	886
Fulton Chain Station	45
Honnedaga Lake	110
Little Moose Lake	265
McKeever	45
Moose River Chain	85

Moose River (North Branch)	20
Nobleboro	30
Northwood	25
Old Forge	225
Otter Lake	35
Twitchell Lake	55
Wilmurt	34
	2,415

Lewis County.

Brantingham Lake	85
Croghan	35
Harrisville	115
Lake Bonaparte	110
Number Four (Fenton's)	130
Oswegatchie River	35
	510

Oneida County.

Otter Lake	45
Trenton Falls	90
White Lake	45
	180

St. Lawrence County.

Benson Mines	35
Childwold	325
Cranberry Lake	265
Gale's	55
Hollywood	45
Kildare	30

Newton Falls	85
Piercefield	43
Sevey	25
Star Lake	315
	1,223

Warren County.

Brant Lake	195
Chestertown	382
Friends Lake	220
Horicon	33
Johnsburgh	28
Loon Lake	25
Luzerne (Hadley)	381
North Creek	80
North River	65
Pottersville	39
Riverside	15
Schroon Lake (See Schroon Lake, Essex County, also.)	320
Stony Creek	85
Thirteenth Lake	25
Thurman	62
Warrensburgh	196
	2,151
Lake George	3,640

Summary.

Clinton County	2,153
Essex County	7,799
Franklin County	4,626

Fulton County	410
Hamilton County	2,395
Herkimer County	2,415
Lewis County	510
Oneida County	180
St. Lawrence County	1,223
Warren County	2,151
Lake George	3,640
	27,502

In August the hotels and boarding houses, with few exceptions, are filled to their utmost capacity, and the total just given—27,502—indicates closely the number of guests in the Adirondacks at that time. With these figures must be kept in mind, also, the equally large capacity of the private "camps" and cottages, each occupied during the season by some family and its guests. But the summer boarders are coming and going from June to September, staying on an average about two weeks each. In the White Mountains, an exhaustive census of the summer people and the hotel business shows that sixty-two per cent of the arrivals remained less than one week.* A careful estimate of the total number of summer visitors from the beginning to the end of the season, as reported by the Adirondack hotels and boarding houses, to which are added the occupants of private camps, shows that 193,681 people went there last season for recreation and health. This includes, also, the sportsmen who went there in May for the fishing, and in October or November for deer shooting.

That this number is not an overstatement is evident from the information kindly furnished this office by the general passenger agents of the New York Central and Delaware and Hudson railroads, from which it appears that 225,000 passengers were carried on the Adirondack divisions during the summer season. These figures do not represent the entire passenger traffic during that period, but the difference obtained by deducting from the total summer traffic, an amount equal to that of the winter months, the difference evidently showing the number of summer boarders, hotel employees, and sportsmen on their way to and from the woods.

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* "The Summer Season in New Hampshire." Special Report by the State Bureau of Labor, L. H. Carroll, Commissioner, Manchester, N. H. Public Printer. 1900.

The following statistics are based on the returns made to this office by each hotel and boarding house in the Adirondack region:

VOLUME OF ADIRONDACK BUSINESS.

Capital invested in buildings, furniture, boats, horses, carriages, etc., *not including land:*	
Hotels and boarding houses	$7,037,923
Private camps and cottages	3,846,500
	$10,884,423
Number of male help employed,—clerks, porters, cooks, bell boys, musicians, boatmen, stablemen, drivers, laborers, etc	3,461
Number of female help employed,—waitresses, chambermaids, cooks, laundresses, musicians, telegraph operators, typewriters, etc	9,846
	13,307
Total wages paid	$993,530
Total number of hotel guests, boarders, fishermen, hunters, and occupants of private camps or cottages	193,681
Cash received for board, carriages, boats, etc	$5,213,210
Cash received for railroad and steamboat fares	875,000

J. M. Schuler, photo.

A PRIVATE PRESERVE.

It is not claimed that the foregoing figures are absolutely correct, as the statements made by some of the hotel proprietors and boarding house keepers in filling out their returns were at times somewhat confused and indefinite; but they will give a fair idea of the stream of wealth that flows into northern New York each summer, and which conduces so materially to the development and prosperity of the State. It is well to note, also, that a good share of the patronage comes from people who reside in other States, and that the profit derived from their business furnishes a revenue that is especially valuable in that respect. And the continuance of this business, with all its accruing benefits, is dependent on the preservation of the Adirondack forests.

The average wages received by the employees, and the average amount paid by guests, may seem too small unless one keeps in mind the short season during which it is necessary for the Adirondack hotels to employ their help, and the short stay of a very large proportion of the summer boarders. In connection with the preparation of these statistics the following letters containing interesting and valuable information were received:

THE DELAWARE AND HUDSON COMPANY.

OFFICE OF THE GENERAL PASSENGER AGENT.

ALBANY, N. Y., *December* 24, 1902.

Col. WILLIAM F. FOX, *Supt. State Forests, Albany, N. Y.:*

Dear Sir.—A careful examination of our passenger traffic statistics made with reference to ascertaining, as nearly as possible, the number of passengers carried and the revenue derived from strictly pleasure and recreation travel to the Adirondack region (in which are included Lake George and Lake Champlain) during the season of 1902, discloses that this traffic approximates closely to 175,000 passengers and $475,000 passenger revenues to the company. We estimate that about sixty per cent of this traffic originates in other States. These estimates do not include the freight and express companies' earnings.

It is apparent to those who have kept in touch with the remarkable development of the health and pleasure resort region of northern New York during the past ten years that the State has in that country an asset of almost incalculable value to its citizens in its power to attract revenue to its farmers, its merchants and its hotel and transportation interests. As one who in connection with his avocation has made a life study of the best means of developing health and pleasure-travel resorts, I would suggest that the best investment the State could make in this direction would be the construction of a model system of highways through its Adirondack domain, affording means of easy communication between points of interest to the tourist, somewhat after the policy adopted in Switzerland, in the Austrian Tyrol, in the mountainous tourist region of Norway and through the White Mountains of New Hampshire. If this were done, it would result in a great increase of travel, not only from other States, but from Europe as well, and I believe that the roads could be properly maintained by tolls without further expense to the State than their initial cost.

Very respectfully yours,
J. W. BURDICK,
General Passenger Agent.

NEW YORK CENTRAL AND HUDSON RIVER RAILROAD CO.,
GRAND CENTRAL STATION.

NEW YORK, *December* 23, 1902.

GEORGE H. DANIELS, GENERAL PASSENGER AGENT:

Subject.—New York State Summer Resort Business.

Col. WILLIAM F. FOX, *Supt. State Forests, Albany, N. Y.*:

Dear Sir.—Mr. Burdick wrote me recently in reference to your call upon him for information which you desired to embody in your annual report covering the value of summer and pleasure travel to the northern New York resorts.

Our Auditor has made an examination of our reports, and approximates the following figures covering business for three months of the summer:

	Passengers.	Railroad fares.
Adirondack section	100,000	$400,000
Thousand Island section	50,000	160,000
Niagara Falls	160,000	170,000
Catskill Mountains	85,000	155,000
	395,000	$885,000

This information, of course, can only be given approximately; but this will afford an opportunity for the people to get some idea of the development of the Adirondacks and other resorts, and what it means to the transportation and hotel interests in the State at large. A large amount of this business comes from outside the State.

The aggregate number of tourists carried by all lines, and the amount of money spent by them for railroad fares, hotel and boarding accommodations and incidental expenses, amounts to a large revenue to the transportation lines and residents of the State. It is worthy to be recognized as a business, and its possibilities of development should command attention.

I shall be glad to give any further information desired in connection with this question, and shall be pleased to receive copy of your report after it is printed.

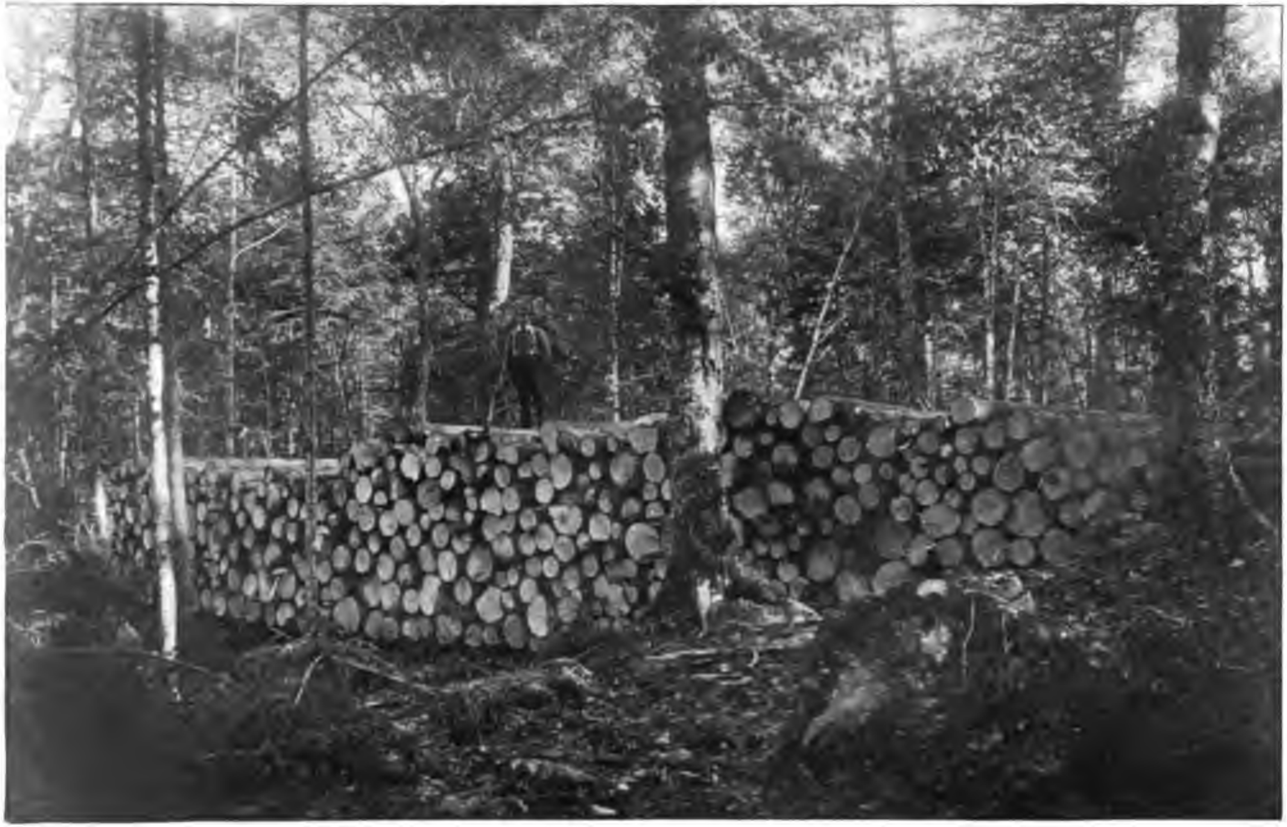
Very truly yours,
GEORGE H. DANIELS,
General Passenger Agent.

The large amount of summer business done in the Catskill region, as indicated by the figures in Mr. Daniels's letter, is also worthy of consideration in discussing the great advantages accruing to our State from its forest districts; but through lack of time I was unable to include in this report any details relating to the hotels and boarding houses in that region.

FOREST PRODUCT FOR 1901.

As customary in the annual report, I include here a statement showing the amount of timber cut for various purposes in the Adirondack and Catskill forests during the year 1901. Considerable time is required for collecting the returns from the different lumber and pulp mills, and as such returns cannot well be made until the year has expired, the publication of these statistics is necessarily delayed until the next annual report of the Commission.

The figures for the year 1901, as compiled from the reports made to this office by the various lumber, woodpulp, cooperage, and wood-acid operators, show a slight increase in the amount of timber cutting in the Great Forest of Northern New York when compared with those of the preceding year; but as compared with 1898, the output is nearly the same. While the total production has not varied much of late years, there has been a continuous increase in



SKIDWAY OF ADIRONDACK SPRUCE.

A. Knechtel, photo.

the amount of spruce used for pulpwood. The returns show an increase also in the cutting of hardwoods throughout the Adirondacks, due in part to the recent erection of cooperage and wood-alcohol plants.

The amount of spruce cut for pulpwood, as stated here, contains considerable balsam and some poplar; but, as the balsam is mixed with the spruce in the log drives and shipments by rail, it would be very inconvenient for the operators to determine the amount of each, and hence no distinction was made in their returns. The amount of spruce reported by the sawmills contained some balsam also; but the proportion of the latter cut into lumber is much less than that used by the pulp mills.

OUTPUT OF ADIRONDACK FORESTS.

1901.

	Ft.B.M.
Spruce (sawmills)	154,430,030
Spruce (pulpmills)	237,483,126
Hemlock	63,809,318
White Pine	46,043,091
Hardwoods (sawmills)	36,452,529
Hardwoods (cooperage, chemicals, etc.)	6,036,804
	544,254,898
Shingles	32,628,500
Lath	51,528,400

OUTPUT OF CATSKILL FORESTS.

1901.

	Ft.B M.
Spruce	2,578,000
Hemlock	18,825,358
White pine	9,185,346

	Ft. B. M.
Hardwoods	27,314,452
Wood for chemicals, 95,124 cords	52,223,076
Wood for excelsior, 3,800 cords	2,086,200
Wood for furniture, 1,510 cords	828,990
Wood for pulp, 3,800 cords	2,086,200
	115,127,622
Shingles	5,519,750
Lath	4,867,800

The hardwoods used in the Catskill sawmills consist mostly of chestnut and oak, species which do not grow on the Adirondack plateau. The hardwood output of the latter region is composed of yellow birch, beech and maple, with a small amount of basswood, cherry and elm.

Some of the furniture factories in the Catskills made their returns in feet, board measure, and some in cords. When the amount was expressed in feet it was tabulated with the sawed lumber; but, if in cords it was placed with the items of that class.

The total output of the Adirondack and Catskill forests is:

	Ft. B. M.
Adirondacks	544,254,898
Catskills	115,127,622
	659,382,520
Shingles	38,148,250
Lath	56,396,200

But the forest product of the Empire State is not confined to the output of the Adirondack and Catskill region. There is a large area of primitive forest in Lewis County, west of the Black River valley, in the towns of Osceola, Montague and Highmarket, which, owing to its isolated situation, is not considered as a part of the Adirondack district. A wide area of productive woodland still remains in some of the counties on the southern tier, especially in Cattaraugus and Chautauqua, while throughout all the farming districts there are scattered belts of timber that furnish a stock of logs, principally hardwoods, for many small mills. Hence the entire forest product of New York is considerably greater than that reported here from the Adirondack and Catskill counties. Any consideration of the latter two districts would thus be misleading as to the total extent of the forest wealth and resources of the State.

Hitherto, this Department has made no effort to secure accurate returns from the sawmills outside the Adirondack and Catskill counties, this information being obtainable at intervals from the report of the United States census. From the latter it appears that the total forest output of New York for the year 1899 was:

	Ft.B.M.
Spruce	255,939,000
Hemlock	314,191,000
White Pine	122,756,000
Other conifers	5,950,000
Hardwoods	207,976,000
Spruce (pulpmills)	199,520,325
Poplar (pulpmills)	17,630,586
Other species (pulpmills)	5,196,834
	1,129,159,745

The pulpwood in the foregoing table is given in the census returns as 363,425 cords of spruce, 32,114 cords of poplar, and 9,466 cords of other species, which are converted here into feet on a basis of 549 feet (B. M.) per cord. As the total output of the

Adirondack and Catskill counties in 1901—the largest in any of the last ten years—amoumted to 659,382,520 feet, it leaves 469,777,225 feet as the lumber output of the outlying counties.

It is doubtful if, aside from the Adirondack and Catskill forests, the woodlands of this State produced 469,777,225 feet of lumber in 1899, and we are forced to the conclusion that the returns for this industry, as made to the Census Bureau by its agents, included some overestimates.

Be this as it may, however, the information contained in the twelfth census relating to the lumber and pulp industry of New York is extremely interesting, giving all the statistics pertaining to forest products with a wealth of detail that makes the report valuable to every one interested in these lines of business. From the censuses of the preceding years it appears that the lumber output of New York passed its maximum years ago. In 1850 it was the leading State of the Union in this industry; in 1860 it was passed by Pennsylvania, and in 1900 it dropped to twelfth place on the list. But it still retains its supremacy in the manufacture of woodpulp and paper, having a long lead of any other State in the magnitude of these industries.

PARTITION OF LANDS.

The printed land list, published in 1901, is an octavo of 367 pages containing a schedule of the 5,934 different lots or tracts constituting the Forest Preserve. In this list there are sixty-one parcels, amounting to 16,088 acres, in which the State has an undivided interest or joint ownership, amounting to 7,478 acres. In the past year a partition of interest was effected in two cases, the land being divided so that the State received a tract of equal acreage and value, set off by itself and in which the State has the sole ownership.

One of these partitions was made with the Raquette Falls Land Company with whom the State owned an undivided ten forty-eighths in certain lots situated in Townships 25 and 26, Totten and Crossfield Purchase, Essex County; the other was made with Charles A. Darby, with whom the State owned an undivided one-half interest in Lot 85, Paradox Tract, Essex County. Before making any division the lands were inspected by Forester Sterling, who filed in the office a report in which he described fully the amount and kinds of standing timber, and submitted maps showing the location and topography. As Lot 85 is situated on Paradox Lake, a division was made which gave the State half of the shore line as well as its share of the land and timber.

It is extremely desirable that a partition of interest should be made in all the lands of the Forest Preserve where the State has a joint ownership, for the joint owner has partnership rights which if exercised would conflict with the forestry laws and management of the public interest. The parties who own these lands jointly with the State seldom ask for a division of the property, preferring as a general thing to let the titles remain as they are. If a division is to be effected it will be necessary for the Commission to authorize its attorney to commence partition suits as provided for in the Forestry Law; or, what would be better, obtain from the Legislature an appropriation sufficient to purchase these outstanding interests.

LOAN COMMISSION LANDS.

Another source of annoyance in the care of the Forest Preserve are the lands acquired by the State through foreclosure of mortgages made to the Commissioners of the United States Loan. Some explanation, perhaps, may be proper here in relation to this class of lands showing how they were acquired and why they are included in the Preserve.

In 1836 the United States being free from debt and with a large surplus in its treasury apportioned this surplus among the various States in proportion to their representation in Congress, retaining $5,000,000 in the government treasury. These moneys were given to the several States as a loan to be repaid when called for.

The Legislature of New York then enacted (Chapter 150, Laws of 1837) that the money thus received should be distributed to the various counties according to population; that the Governor should appoint two commissioners in each county who should loan these funds "on mortgage on improved land" in sums not exceeding $2,000, and for periods not longer than five years; that in case of foreclosure the property should be sold to the highest bidder; and that in case no bidder appeared it should be bid in for the State by the commissioners.

Under the provisions of this law the State acquired and now owns parcels of land, containing in the aggregate 10,488 acres, situated in the Adirondack and Catskill counties. The loan commissioners have the right under the law of 1837 to sell these lands again, and acting under its provisions they sold last year several lots in Ulster County that are borne on the Comptroller's books and on the land list of the Forest Commission.

Although the law of 1837 confines these loans to improved property, many of the farms thus mortgaged included considerable wild land, wood lots and areas of forest, the cleared ground on which the buildings stand forming in some instances only a small portion of the acreage. In some cases the farm has been abandoned, and the part that was cleared has become overgrown with small trees or bushes.

Take, for instance, Lot 375, Township 11, Old Military Tract, in the town of St. Armand, Essex County. This lot contains 160 acres.

About 35 acres were cleared at one time and a house built; but the farm was abandoned and the clearing has grown up largely to brush and scrubby trees. The rest of the tract is covered with a hardwood forest, the spruce and other softwoods having been cut out by lumbermen several years ago. A few acres, only, were cultivated by the last occupant, who cut some wild hay, also, on this lot. The State acquired title to this land in 1893 through a foreclosure of a mortgage, and has paid taxes on it since that time. It is assessed to the State on the tax roll of St. Armand for this year, is borne on the Comptroller's books as part of the Forest Preserve, is on the published land list of the Forest Commission, and is colored red on the Adirondack map to indicate the ownership. And yet, the loan commissioners of Essex County leased this lot on January 14, 1892, to one Joseph Fortain, for five years, at an annual rental of $25.

The law defining the Forest Preserve provides that it "shall include the lands owned or hereafter acquired by the State" in sixteen specified counties, with certain exceptions, among which are: "Lands *not wild lands* acquired by the State on foreclosure of mortgages made to loan commissioners." This would indicate that the forest areas and "wild lands" thus acquired belong to the Preserve; otherwise, the exception is meaningless and unnecessary. Still, where one of these lots is part clearing and part forest it is difficult to determine its status at present, and whether it is within the jurisdiction of your Commission.

To avoid conflict with any loan commissioners as to the management of such properties I would respectfully suggest that a survey be made of each, and a map of the same be filed with the Comptroller showing just how much is wild or forest land: that the portion so described be set off in each case and added permanently to the

Preserve; and that the legislation necessary to effect such an arrangement be obtained. If this is deemed unadvisable or impracticable it would be well to amend the clause containing the exception quoted so as to leave all these lands in the care and custody of the loan commissioners.

It may be well to add here that the peculiar class of lands discussed in the preceding paragraphs should not be confounded with the bonded lands on our land list, title to the latter having been acquired from a different source.

FORESTERS' REPORTS.

Forestry is a science which, though centuries old, is a progressive one. Modern inventions and mechanical appliances are developing improved methods for exploiting our woodlands, while the researches of foresters and horticulturists are evolving new lines of silvicultural work.

The American Chestnut is a forest tree that has always furnished merchantable timber; and, now, through scientific experiment, its desirability as a nut-bearing species has been enhanced by the propagation of varieties that bear fruit of large size and superior quality, giving thereby an increased value to a species which is so common in the Catskill forests and other parts of New York. My attention having been called to the successful efforts made in a neighboring State for the cultivation of this species and the improvement of its nut-bearing capacity, Forester Sterling was directed to make an extended tour through the localities where chestnut groves had been established. He was instructed to obtain all possible information as to the result of this experimental work, to secure photographs of the plantations, and to make a written report to this office. As the account of his investigations will be valuable to every one interested in this line of silvicultural operations

I append it herewith and respectfully ask that it be included in your printed report to the Legislature.

The Forestry Department of the Commission has received several letters from citizens soliciting information regarding the management of their woodlands, or advice as to the treatment of trees which were failing or dying from some unknown cause. In some of the latter cases,—when the regular business of the Department would permit,—a forester was detailed to visit the place, examine the trees, give such information or advice as the circumstances seemed to demand, and make a written report on the same to the Superintendent. As some of these special reports contain information and suggestions that may be of benefit to others, I append here, also, one made by Forester Knechtel regarding the destruction of shade trees in Flushing and Port Jefferson, Long Island, where he had been sent in response to demands on the Department for expert assistance.

All of which, together with the sub-reports of the foresters just referred to, are respectfully submitted.

WILLIAM F. FOX.

Special Report of Forester Knechtel on Dead and Diseased Trees in Flushing and Port Jefferson, Long Island.

ALBANY, N. Y., *December* 9, 1902.

Col. WILLIAM F. FOX, *Supt. State Forests:*

Sir.—On the 28th of last March I visited Flushing, N. Y., in accordance with your instructions to determine, if possible, the cause of the death of trees reported to the Forest Commission by the Good Citizenship League of that place. Dr. E. P. Felt, State Entomologist, whom I chanced to meet at that time in New York City, very kindly accompanied me.

The shade trees of Flushing are remarkable for their number, beauty, size, and variety. One hundred and forty species,—native and foreign,—together with numerous varieties, have been counted within the limits of the place. For two centuries its trees have been the pride of the old town.

Nurseries founded there in early times have facilitated the planting of trees. The horticultural interests of America were first established commercially in Flushing, although the arts of budding and grafting had been previously practiced by the French Huguenot immigrants. In 1737, William Prince began a nursery and garden which in 1860 contained 113 acres. The Civil War, however, curtailed the patronage to such an extent that the business was ruined and the lands were afterwards appropriated by the village for building purposes.

In the year 1790, James Bloodgood founded the nurseries bearing his name, now under the very successful management of Messrs. Keene & Foulk. These are the oldest nurseries in continuous existence in the country. For nearly half a century they were conducted by Mr. Joseph H. King, one of the most enterprising citizens in the town.

The Parsons Nurseries were established in 1840, and with the others mentioned have made Flushing known to horticulturists all over America.

To the nurseries must be attributed much of the taste for rural adornment so characteristic of the place. Besides the native species of trees are to be found the Cedar of Lebanon, the Chinese Taxodium, the Southern Cypress, the Paulownia, Japanese Maples, and many other nursery varieties.

Some of these trees are very noted. A stone near the sidewalk on the west side of Bowne avenue, opposite the Bowne house, marks the site where stood two famous oaks called the "Fox Oaks." Under these trees George Fox, the founder of the Society of Friends, held a " glorious and heavenly meeting," as he himself described it. They measured respectively 13 feet, and 12 feet 4 inches in circumference. One of them fell in the year 1841 and the other in 1863. In Washington place stands a weeping beech which Sir Joseph Hooker pronounced the largest specimen of its kind in the world. On Parsons avenue, just south of Broadway, there is perhaps the finest row of taxodiums in the United States. A very fine Cedar of Lebanon stands in the dooryard of the Prince house on Bridge street and Lawrence avenue. The streets are beautiful with great oaks, tulips, maples and lindens.

Trees, like men, live, grow old and die. Many of the trees in Flushing are old, some being more than one hundred years of age. To be sure, in the forests, trees can be found that have lived five hundred years; but in a city, where so many injurious influences are at work, a tree does well if it lives a century. Robert Hartig, a German writer upon plant pathology, does not admit that a tree dies from internal natural causes. The cause of death, he asserts, is always to be found in unfavorable influences. Be this as it may, when the decay of trees becomes epidemic it is evident that it must be attributed to external causes. A large number of the Flushing trees died in the years 1901 and 1902, and it was on this account that the request came to the State Forest Commission from the Good Citizenship League for an investigation.

On examining the trees of the place many species were found to have on the bark numerous cocoons of the white-marked tussock moth. These cocoons are of a dirty gray color, and each bears upon it a glistening white object which, upon close examination, is found to consist of numerous eggs partly covered by white spittle-like matter. This mass consists sometimes of 700 eggs. The eggs hatch about the middle of May, and the young caterpillars scatter over the tree and feed upon the leaves, often causing entire defoliation. A full description of the insect and its habits, accompanied by colored illustrations, can be found in an article by Dr. Felt in the Fourth Annual Report of the Forest, Fish and Game Commission.

Evidence of a great ice storm which occurred in this locality last February was everywhere visible. Very many trees were broken, some being utterly destroyed. Along the streets were large piles of rubbish consisting of limbs broken off by the storm.

On examining these branches it was found that the leopard moth had also been active among the trees. This is considered probably the worst insect enemy of the shade trees in the vicinity of New York City. The eggs are deposited in crevices of the bark. The young caterpillars, on hatching, enter the twigs, usually at the base of a bud, and tunnel along the pith, eating away the wood here and there almost to the bark. As the caterpillars increase in size they attack the larger limbs and even the trunk of the tree.

The curiously shaped bags, or larval cases, of the bag worm were also found suspended from some of the trees. This insect in the adult stage is a moth. The larvae are caterpillars, which are leaf feeders, attacking many species of trees, but more especially the arbor vitae and the red cedar.

There is need of more definite observation to determine how long trees will live when defoliated each year by insects. It is well known that they will endure defoliation once without serious injury. Certain trees in Flushing which were pointed out as having been on, is

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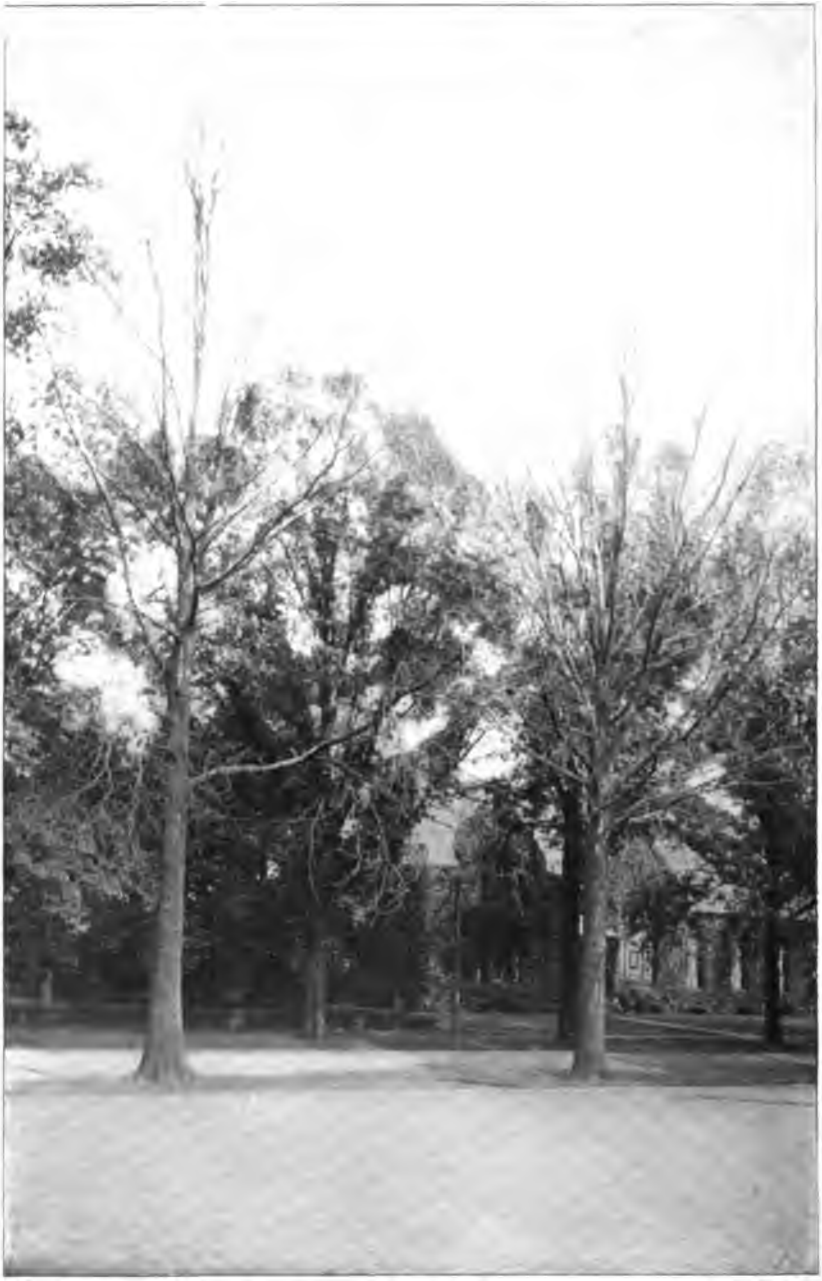


A. Knechtel, photo.

PIN OAKS KILLED BY LEAKAGE FROM GAS MAIN.

Flushing, L. I.

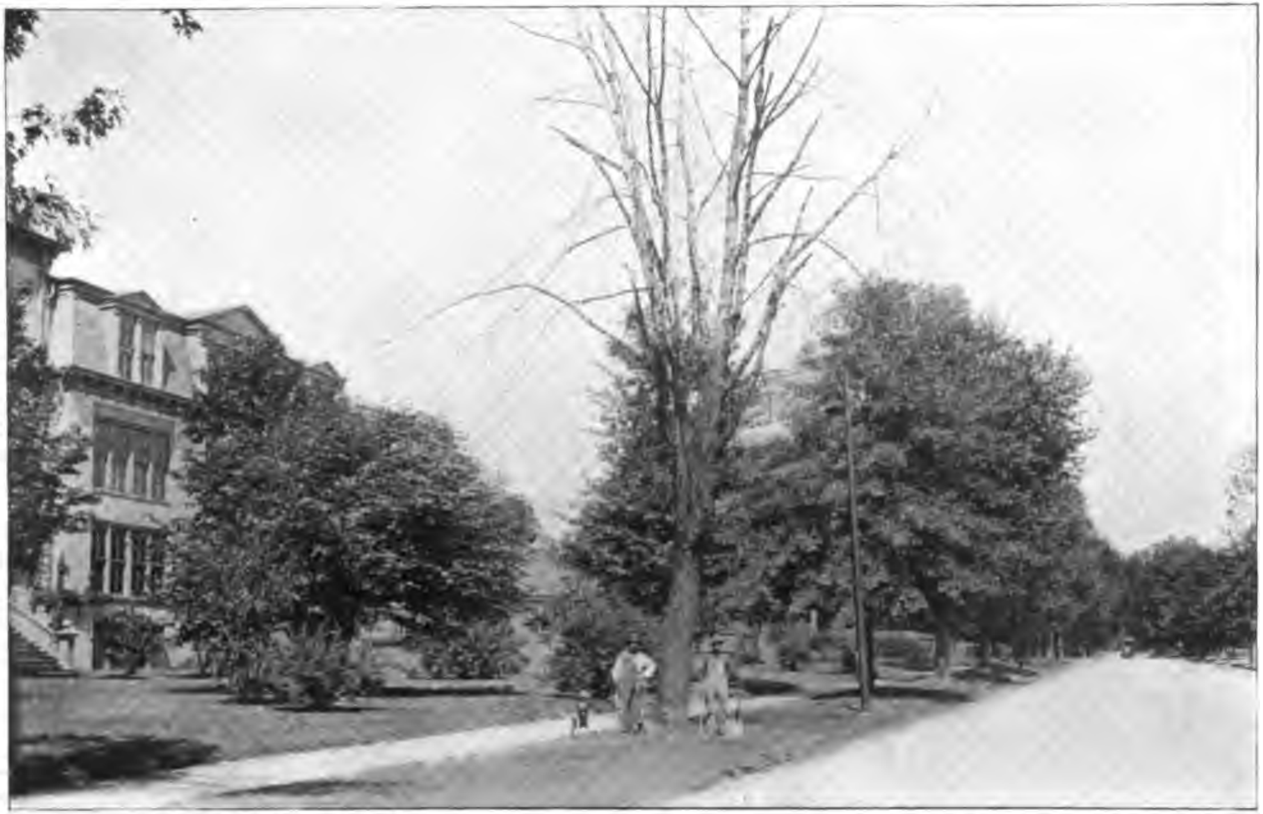
entirely stripped of leaves last year were in August of this year in the most luxuriant foliage. Mr. W. S. Egerton, Superintendent of Parks, of Albany, N. Y., states that a tree will endure defoliation by insects for about four years. Borers, such as the leopard moth, that destroy the branches, are more to be feared than the leaf feeders. Evidences of the work of the leopard moth, however, were not sufficiently abundant to warrant the conclusion that the trouble was very largely due to this insect.

No doubt the trees of Flushing have suffered from insect attack, especially from that of the white-marked tussock moth, and I advised the Good Citizenship League to have the school children collect and burn the cocoons of this insect, and the larval cases of the bag worm. As a result, many thousand were thus destroyed last spring.

However, the impression seemed to be general among the people that the trouble was due not so much to the insects as to electricity from the trolley wires and to gas leaking from the mains. To investigate this matter a blank was prepared for the purpose of locating trees that had died within two years, and to determine whether the trees stood on the same side of the street as the gas mains or trolley wires, or across the street from the same. Twelve copies of this blank were sent to Mrs. Mary K. Whittaker, who distributed them among members of the Good Citizenship League. Twelve streets were recorded as having dead trees. All these streets had gas mains, and five had trolley lines. Twenty-six trees were reported as killed. Eleven were on the same side as the gas main and five were across the street from it. The remaining ten were indefinitely reported. Two trees were mentioned as being on the same side as the trolley line and one across the street. Thirteen were on streets that had no trolley line. The trees reported as killed were tulip, linden, Southern cypress, elm, maple, oak and fir. From the tabulation of answers the evidence seems strongest against the gas mains.

I visited the place again in August and had a dead tree dug up to see if gas had injured the roots. In this I was kindly assisted by Mr. Charles Thomas, Vice-President and General Manager of the Flushing Gas Company, who furnished the men to do the digging. A maple tree, 15 inches in diameter and about 35 feet high, which stood in front of the school house on Sanford avenue was selected, a permit having been obtained from the Commissioner of Parks. The roots were much blackened, as if colored by acids, and a strong odor of gas came from the excavation. It should, however, be stated that the branches of the tree had been broken by the ice storm which occurred in February, telephone wires were strung upon it, and it had suffered somewhat from insects. Sections of the trunk and branches were sent to Albany by Mr. Frank A. Collins, Deputy Superintendent of School Buildings. These, though showing some rot, do not give evidence that the borers had injured the tree sufficiently to cause its death. It is well known, however, that leakage from gas mains is a common cause of the destruction of trees. Twenty were thus killed in Albany this year, six Norway maples on Western avenue and fourteen elms on State street. How much the death of trees in Flushing is due to leakage from gas mains can be determined only by the examination of a large number of dead trees, and this examination can be carried on best by the people who have suffered damages from this cause.

Trees are no doubt injured by electricity when feed wires come in immediate contact with the branches. Many instances are known of their having been set on fire from trolley wires. Unless such



A. Knechtel, photo.

WHITE MAPLE KILLED BY LEAKAGE FROM GAS MAIN.
Flushing, L. I.

contact exists, however, it is doubtful that the trees receive any injury from electricity.

As in all cities many trees had been damaged by mutilations, some by the gnawing of horses, and some by having been cut in digging for water mains, gas mains and sewers, and in laying curbstones. Trees, also, no doubt die from lack of plant food, or from lack of water and air about the roots. Streets and sidewalks are made hard and nearly impervious to water and air, and trees standing close to them must suffer as a consequence.

I would refer the Good Citizenship League to Bulletin 131, published in November, 1900, by the Connecticut Agricultural Experiment Station, New Haven, Conn., and would advise that they act as far as possible upon the following recommendations which I have here given essentially as they are written in that publication.

1. The rigid enforcement of the city ordinances which forbid the bruising, injuring or destroying of trees, and the fastening of animals to trees in such a way as to injure them.

2. That all trees standing within reach of horses in the street be protected by frames or wire netting so that they cannot be mutilated.

3. That when limbs are removed from trees greater care should be exercised to cut them smoothly, close to, and even with, the trunk and without tearing the trunk bark. The exposed wood should be painted with coal tar.*

4. That the stringing of electric wires be done only under the supervision of the Board of Public Works, and that this supervision be paid for by the company doing the work.

5. That when trees are killed by gas leaking from the mains, the owners of the mains be required to pay to the city the cost of the removal of trees killed and of planting new trees in their places.

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* Prof. L. H. Bailey, of Cornell University, recommends lead paint.

6. That the land under trees in city parks be annually dressed with wood ashes.

7. That on new streets when the building line is far enough from the street line it is desirable to plant just in front of the property line rather than just back of the curb.

8. That trees infested with leaf-feeding insects be sprayed regularly for a few years, and thereafter as seems necessary.

9. That in winter, insects, and the cocoons of insects that injure the trees, be collected and destroyed.

I advised the Good Citizenship League concerning the measures that should be taken for the protection of the trees. As my recommendations, however, contained practically the same advice as those quoted from the bulletin referred to it is unnecessary to repeat them here.

TREES AT PORT JEFFERSON.

On the 21st of November I visited Port Jefferson, Long Island, to determine, if possible, the cause of the unhealthy condition of pine trees reported by Mr. A. W. Law, of New York City.

The trees I found to be Pitch Pine (Pinus rigida). They are in a park on the property of the Crystal Brook Park Association, of which Mr. Law is a member, and are situated on a gravelly ridge, excellent soil I should judge for the growth of this species. A number of trees were dead and others were fast dying.

Two trees were dug up by the roots and examined thoroughly. One of these was still alive though in a very weak condition, due, it appeared, to two causes. The tree had been pruned probably two or three years ago and decay had entered the trunk through the wound. It was also suppressed by the shade of larger trees surrounding it. Several pines in the park were found to be suffering from this latter cause. The other tree examined was dead. The roots, to the distance of four or five feet from the tree, had been attacked by fungi, which had also ascended the trunk for about two feet. The tree had also been much damaged by borers and bark beetles. I examined a large number of trees in the park and judged that disease among them was due very largely to insects and fungi.

The trees were being pruned at the time of my visit, the branches being chopped off at a distance of from three to six inches from the trunk, and fresh stable manure was being placed around the roots.

I would suggest that all old, rotting logs, all dead trees, and all dying trees beyond hope of recovery, be removed from the park, as this dead material furnishes excellent breeding places for insects, and gives food for fungi which also attack the living trees.

The trees should be trimmed with a saw and the branches should be cut close to the trunk. Spores of fungi which will cause the tree to decay find a good lodging place on a ragged cut such as is made with a dull axe. If the branch is sawed off even with the trunk of the tree the new wood will grow over the wound, while no such healing will take place if it is cut leaving a stub. The wound should be covered with lead paint. This will exclude bacteria and fungi and check the weathering without injuring the cambium and bark. March is perhaps the best month for pruning, although the season is not so important as the manner in which the work is done.

I would suggest that wood ashes be used as a fertilizer. Stable manure contains beetles and fungi and brings them with it to the soil where it is applied, while these are destroyed by the ashes. Moreover, wood ashes contain all the elements that trees take from the soil, and hence are an ideal fertilizer.

A suppressed tree should be either relieved or removed. If, on account of its species, or for any other reason, it is a more desirable tree than the others that shade it, it should be relieved by the removal of one or more of the latter. Otherwise, it should be cut, as it hinders the growth and symmetrical development of its neighbors.

Very respectfully,
ABRAHAM KNECHTEL.

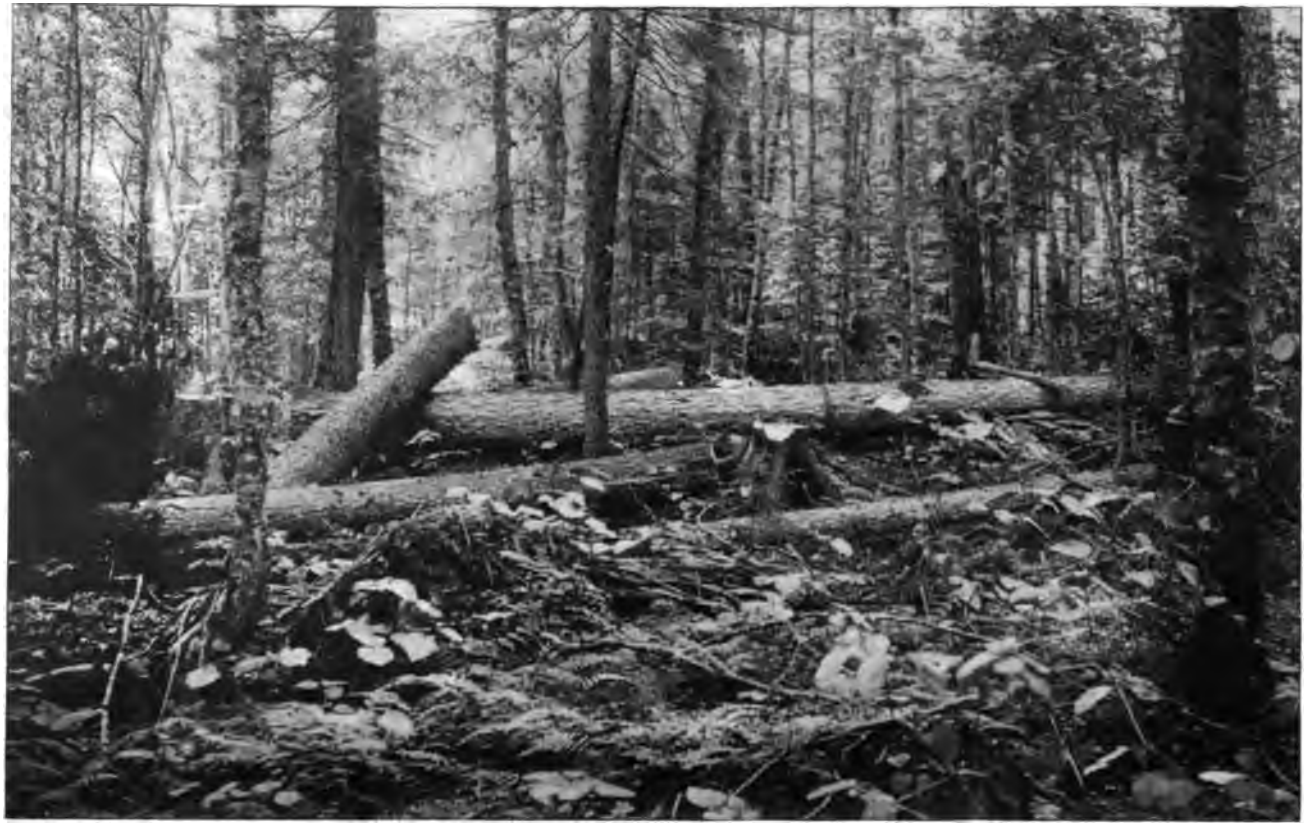
Special Report of Forester Pettis on the Gathering of Spruce Seed.

ALBANY, N. Y., *December* 8, 1902.

WILLIAM F. FOX, *Superintendent State Forests:*

Sir.—In accordance with your directions I spent some time this fall in collecting a supply of seed from our native Red Spruce for use in the State Nurseries next spring, and would respectfully submit in the following pages a report on the details of the methods and operations connected with that work.

The collection of tree seed is as much the work of the forester as the gathering of seed corn is that of the farmer. The market price of red spruce seed, when obtainable at all, is $2 per pound or more, with no assurance of its quality or that it will germinate, facts which stimulated us in our efforts to secure a supply. The results obtained from this work may render a record of our experience valuable to others who may wish to collect seeds of this species, and may be useful at the office of the Commission in answering requests for information. Further work along this line will probably suggest better methods; but, such as they were, I will venture to describe them here. Only red spruce seed was collected, as no white pine cones could be found in our forests this year.



Lumber Job where the Cones were Picked.

A. Knechtel, photo.

RED SPRUCE CONES.

The cones of the Red Spruce—*Picea rubens* Sarg.—are ovate-oblong, narrowing gradually from near the middle to an acute apex. In length they vary usually from about one and one-fourth to two and one-fourth inches, with a diameter at the middle of five-eighths to one inch. The cones are made up of scales attached to a central stem and overlapping one another, an average sized cone having about fifty scales. At the base and on the upper side of each scale are two little depressions, each of which contains a winged seed. The seeds are small, about one-third the size of a grain of buckwheat.

The largest quantity and best quality of cones were found on medium sized trees, twelve to eighteen inches in diameter, situated above the swamps or on the hill sides. Similar trees were often found side by side—one with cones, the other without. There was no apparent reason for this difference, unless it was that the fruiting tree enjoyed more light.

The cones are found on the uppermost lateral branches, and at the tips, usually, within six to ten feet of the crown. The greatest number are on the tip top, with the largest and best cones on the ends of the lateral branches or twigs.

GATHERING THE CONES.

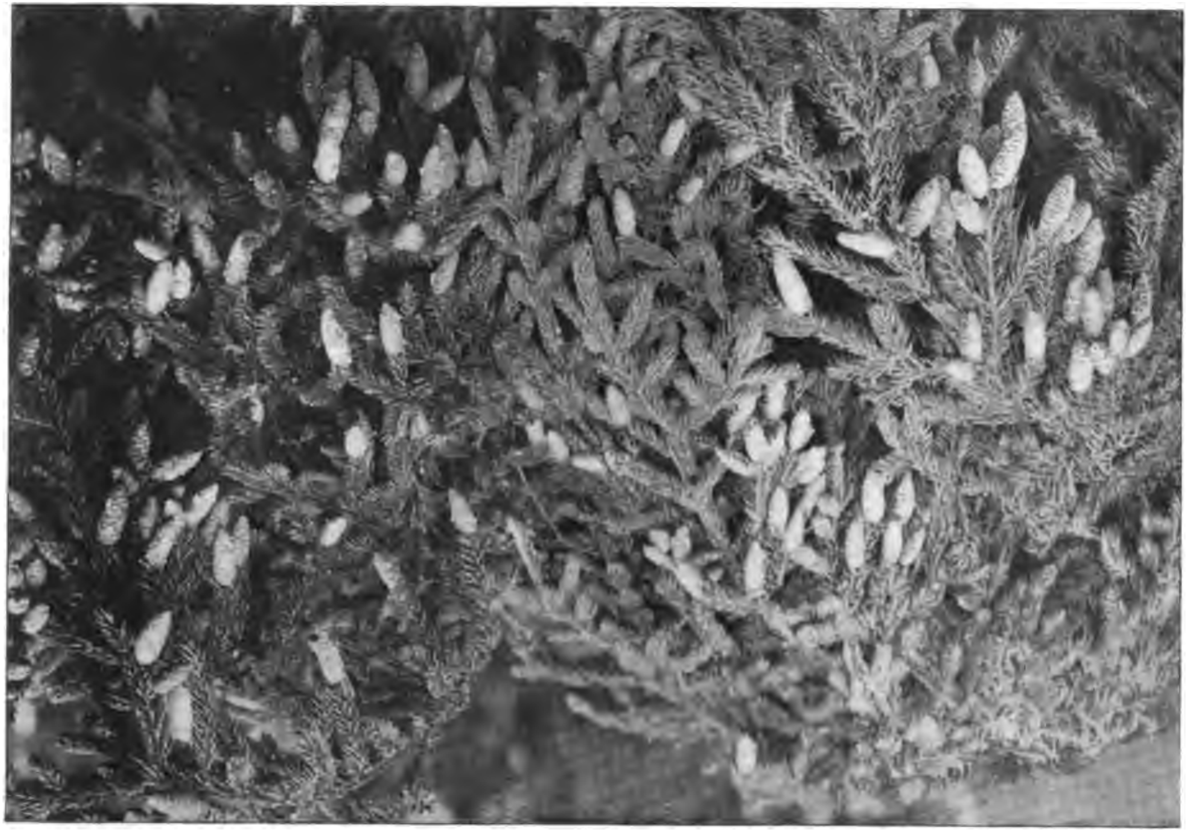
After a trip through the Adirondack forests to find a favorable location for carrying on the work, a place was selected in the vicinity of Fulton Chain where the trees were bearing well. There were six large lumber camps within a few miles, and the trees that were felled by the axemen gave us easy access to the cones which were clinging thickly to the tops.

Progress at first was very slow. It was difficult to obtain laborers for this peculiar work. The men around the logging camps could not understand why any one wanted "spruce buds," as they commonly call the cones. They hesitated, and were afraid to pick by the bushel. No amount of assurance that they could pick a certain number of bushels per day would get them started. Then, again, the "loose men" about a place are usually not very reliable, and one hesitates in hiring them by the day, especially if they are to be left to work by themselves. But the State requires only eight hours' labor for a day's wage, while the men in the lumber camps had to work ten hours or more, and so I succeeded finally in hiring enough help.

The cones were picked from the fallen tops on the lumber jobs; but as the location of each job was three or four miles from Fulton Chain it became necessary for the men to board in the logging camps. These camps were crowded with their own men, but through the courtesy of Messrs. McMulkin, Wakely and Harwood, I secured accommodations for the cone pickers. It was a pleasure to note the interest taken by the lumbermen in this work, and I desire to acknowledge here the substantial assistance afforded by them whenever an opportunity occurred.

The prevailing high rate of wages—$35 to $40 per month with board—rendered the task of securing good men more difficult, especially as our job was a short one. But I finally obtained the few men I needed, industrious fellows, who did good work. The first man began September 10th at $2 per day; and the second man on the 12th. On the morning of the 15th four men went to work at seventy-five cents per bushel; and on the 16th a third man by the day.

Each man provided himself with a small axe, pail, and a bottle of kerosene oil. He worked alone, following up a pair of sawyers, picking the cones from the fallen tops, bagging and carrying them



TREE TOP OF FALLEN SPRUCE FILLED WITH CONES.

A. Knechtel, photo.

to where they could be loaded on a wagon or sled. The method employed varied with the individual. Some pickers put the pail on the ground, pulling off the cones with one or both hands after the fashion of picking blackberries. Another method followed was to cut off the small, heavily laden twigs, and thrash them over the edge of the pail until the cones had all fallen into it. Probably, the best way, especially for a man picking by the bushel, is one that might be termed the stripping method. The pail was set on the ground under the end of a spruce branch, or held between the legs. The picker reaches back along the branch, one hand on each side, shuts his hands and pulls toward him, stripping the cones off into the pail. A quart or more can often be obtained in this way at a single pull. The only disadvantage is that many small ends of twigs are broken off and have to be picked out later. As most of the cones are covered with large globules of soft pitch, the collecting is both unpleasant and slow. This difficulty, however, is easily remedied by a few drops of kerosene oil, which effectually cuts the pitch and allows the cones to fall from the hand into the bucket.

The cones were drawn to the drying house at Fulton Chain every third day, or oftener. They could not be left in the sacks any longer, as they are at all times apt to become heated. A reddish brown color, a feeling of warmth, or a strong, sprucy odor, are indications of heating. The topography will naturally affect the expense of cutting roads and difficulty in getting the cones to the drying house. In this case the cartage amounted to ten cents per bushel, the distance averaging six miles for the round trip.

DRYING THE CONES.

A room for drying the cones, so that the scales would open and loosen the seeds, was rented at Fulton Chain Station. Wooden frames or racks, like the bunks in a logging camp, were erected, into which the sacks were emptied and the cones spread out to dry. Two stoves were put up in the room, and the drying process was thus hastened by artificial heat.

Where a considerable quantity of seed is to be gathered, the bulky volume of the cones necessitates a large room with a great area of drying space. From our experience in this particular part of the work it would appear that the best form for the racks or bins can be obtained by using 2 x 4 scantling for uprights, with cross pieces for the support of the boards which form the bottoms of the bins. As the cones are heavy, these uprights should be placed at intervals of six feet. The bins should be in tiers, one above another, four tiers high. The bottom one may rest on the floor; the next one should be twenty inches above the floor, while the two upper ones may be eighteen inches apart, the distance being dependent on the ease with which the cones can be stirred and handled. The tiers should run the whole length of the room, with aisles of suitable width, say two feet and a half wide. The bins should be five feet wide; if wider, it will be inconvenient to reach the middle, and if narrower, there will be too great a proportion of aisle space. For the sides of the bins, inch boards, four or five inches wide, turned on edge, may be used; although the mass of cones should not be over three inches deep. The sides and bottoms should be made of inch boards dressed on one side and jointed on the edges; then any shrinkage of the bottom boards, caused by seasoning, can be taken up by inserting wedges between the upright and the edge of the outer board. No nails are necessary, and the boards can be taken down whenever the space is needed for other work. A tight bottom can also be obtained by using tongued and grooved flooring,—" matched stuff,"—but the framework cannot be taken down so readily.

The cones, when brought to the drying room, were emptied from the sacks in a pile on the floor, where they were shoveled into a half-bushel measure, carried to the racks or bins and spread out to dry, a record being kept of the number of bushels thus handled. For clean cones the measure was taken level full; but when they were not clean the measure was heaped to make allowance for dirt and bits of twigs. When the cones were very dirty, the leaves, dirt, bark, dead cones, and twigs were picked out before measuring.

COST OF GATHERING CONES.

Eleven and one-half bushels were received September 13th; fifty-four bushels on the 18th; seventy-two and one-half bushels on the 20th; thirty-three bushels on the 22d; twenty-nine and one-half bushels on the 23d; total, two hundred and one-half bushels. Of this amount one hundred and forty-two bushels were received from the men who picked by the bushel, and fifty-eight and one-half bushels from the men who worked by the day.

The cost of the cones obtained from men working by the day was eighty-seven cents per bushel, or twelve cents more than those picked by the job. Good men can easily average six to eight bushels per day when the yield of cones is as large as it was this season. One man, by stripping the cones from the branches, picked twenty-eight bushes in three days. The difficulty is in getting men started, and it was for this reason that the liberal rate of seventy-five cents was offered. In a good seed year fifty cents per bushel would be a sufficient inducement, as profitable wages can be earned at a less rate by men who are not afraid to work. The total cost for picking the two hundred and one-half bushels was one hundred and fifty-seven dollars and twenty-five cents, an average of seventy-eight cents per bushel.

EXTRACTING THE SEEDS.

Drying the cones and extracting the seeds is by far the most important and critical part of the entire work. It is the longest process, one requiring the most careful attention and the exercise of good judgment. When cones dry naturally the scales near the base do not open and liberate the seeds; but in a room properly warmed these scales open freely so that the seeds will drop out. The length of time necessary for spruce cones to dry so that they will open satisfactorily depends:

(1) On the number of square feet of drying space per bushel.

(2) Whether the cones dry naturally, or whether artificial heat is used.

(3) The time of year when the cones are picked.

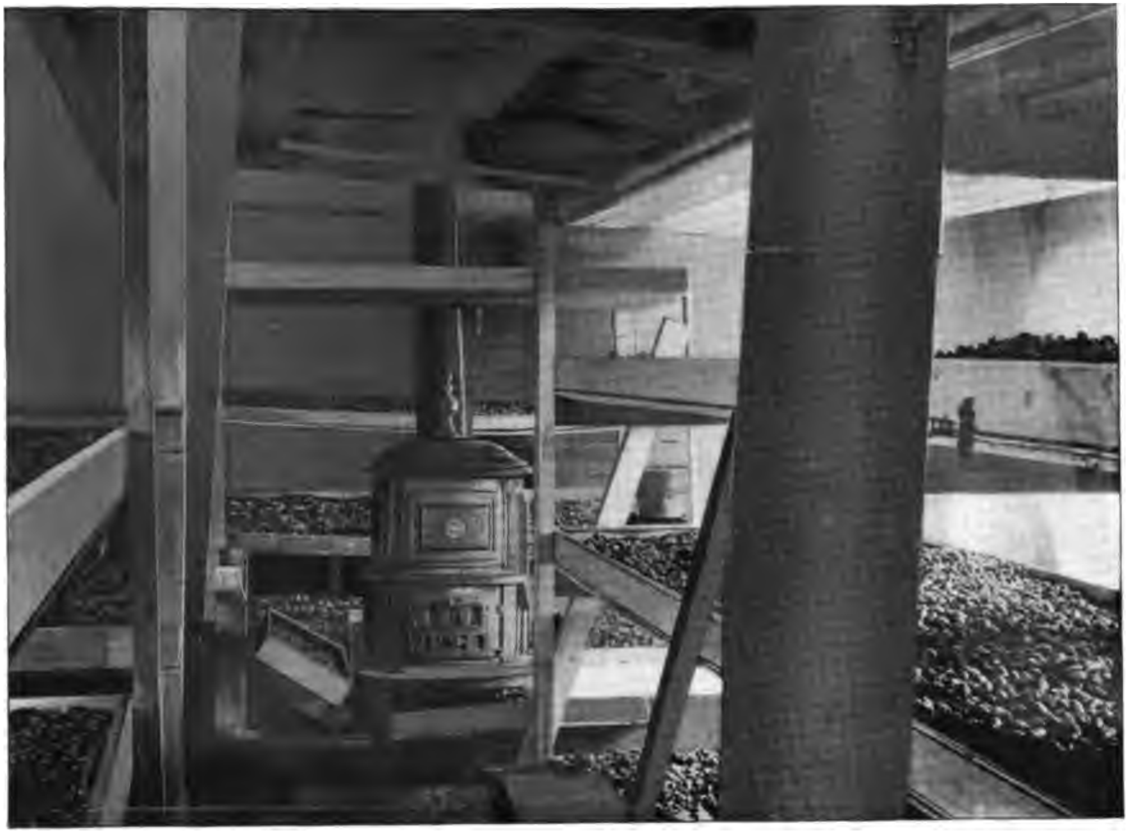
(4) The humidity of the air during the drying process.

(5) The care exercised in stirring, sorting and cleaning while in the racks.

Naturally the thinner the cones are spread on the floor of the bin the faster they will dry. A liberal allowance of space would be twelve square feet per bushel. In a drying room which is well heated and thoroughly ventilated they will open much quicker than if the process is conducted under other conditions. Ventilation is necessary to carry off the moisture and thus prevent mildew; for, if no heat is used the cones will lie in the racks a month or more without opening.

Spruce cones picked when green are especially slow in opening. Those gathered before September 20th were, in this case, the last to open; while those picked last opened first. Those received on September 13th lay in the racks three weeks without showing any signs of drying; but the stock received last began to open in less than a week.

When a few pounds of seed only are needed, September 25th, or thereabouts, would be the best time for gathering spruce cones in the Adirondacks. After October 1st the shock to the tree in falling



RED SPRUCE CONES—THE DRYING ROOM.

C. R. Pettis, photo.

is sufficient to shake a large part of the cones from the branches. It does not pay to pick them off the ground, for they are too much scattered and covered with the rubbish that clings to their pitchy surface.

When the cones are first brought in from the woods they are so thickly smeared with sticky, resinous matter that, when spread out on the racks, they are liable to form a solid mass and harden. Unless they are stirred daily to keep this cake thoroughly broken up. the drying process will be seriously delayed. After a week or ten days, however, this troublesome condition ceases.

During the drying process heat may be used all the time, or only at the finish. A large box stove in the room, combined with ample means for ventilation, will greatly facilitate the work. Should the weather be damp and cloudy, and no heat be used, the cones will lie on the racks for weeks without showing any signs of opening; but if the air in the room be warmed and dried, in a few days you will both see and hear the scales open.

When the drying and opening process is fairly under way, the partly opened cones are assorted and placed in some warmer spot, after which the basal scales will also yield and liberate their seeds. While the cones are drying considerable moisture is thrown off, necessitating a complete ventilation of the room, and a daily stirring of the cones to prevent mildew. Should mildew appear the cones must all be picked over, and any thus affected thrown away. The racks must be stirred twice each day and better ventilation provided.

The spruce cone is frequently infested with a borer, which burrows in it, and destroys it, without eating the seed. It usually bores into the smaller end, making a hole scarcely larger than a pin head. On this job the cones were all picked over carefully by two men, who removed and burned the ones thus infested, after which I had no further trouble from these worms.

The cones, as fast as they opened fully, were picked out of the bins and threshed at the rate of ten bushels per day. A bushel of green cones doubles its bulk in the opening process. The removal of the opened cones depleted the contents of the racks so that the remaining ones dried much faster, so rapid that we were soon able to take them off the upper bins by the double handful, and to reduce the temperature in the room. Towards the close of the work three men could assort and thresh forty bushels of open cones per day.

THRESHING OUT SEED.

When the cones are fully opened, ready for threshing, they were sacked and left until ten bushels had accumulated. Then a peck of the opened cones were put into a two-bushel bag, swung in the air, and pounded on the floor, first swinging the bag over one shoulder and then over the other, so that the bag would strike alternately on opposite sides. About twenty-five hard strokes removes the seeds from the cones. The contents of the bag were then poured out on a wire screen with a quarter-inch mesh—a "sand screen"—through which the little black seeds were sifted into a receiving box, the cones and refuse remaining on top being thrown into a heap to be used for fuel.

One man can thresh ten bushels per hour; but the work should be arranged so that the threshing should not last over an hour or so at a time. It should be done in a separate room or out of doors; because in pounding the cones the dried pitch is pulverized and fills the air so that breathing becomes difficult. To alleviate this annoyance each man wore a wet sponge over his mouth and nose while threshing.

CLEANING THE SEEDS.

The small size of spruce seed renders the cleaning process difficult. The seeds and dirt that fell through the screen into the box were sacked and stored in the drying house, where they would not gather dampness, to await the final process of cleaning. When the time came to take up this part of the work the seeds and fine dirt were taken from the sacks and rubbed through a screen with a fine mesh to remove the larger particles of dirt, after which the seeds were put through a fanning mill. The wings of the seeds were broken and removed, for the most part, in the threshing; but some pieces, together with other material, still clung to the seeds, and a fanning mill was necessary to thoroughly clean them of all chaff and dirt. On this job no mill was easily obtainable, and so I constructed one to suit the emergency. It had four fans on its shaft, and was provided with a double row of sieves. A four-inch pulley was attached to the shaft and belted to a grindstone for the power. It was a crude, home-made arrangement; but it did the work all right.

When the mill was in motion the seeds were emptied into the mill, just back of the fan and in front of the first sieve. The heaviest ones fell directly down, through the mill, in front of the sieve and into a bag, while the dust and lighter seeds were carried back where they received a further winnowing. The heavier seeds that fell in front, freed from chaff and impurities, were kept separate. The lighter seeds that fell through the farther opening were put through the mill again, and these were also kept separate. Any seeds that were blown beyond the front screens a second time were thrown away, as they evidently were not well filled.

As a final result we obtained 375 pounds of seed, or nine and three-eighths bushels, from the 200 bushels of cones. Of this amount, 205 pounds were seeds of the first quality. The following summary of facts obtained during the course of the work may be valuable for future reference:

6 to 8 bushels of cones can be picked on the average by one man in a day's work of eight hours.

50 cents per bushel will enable a man to earn a fair day's wages.

10 to 15 square feet of drying space is required for a bushel of cones.

60 pounds per bushel is the weight of green cones.

1 bushel of green cones will make two bushels of opened cones.

1 bushel of green cones will yield on an average 1⅞ pounds of seeds.

1 bushel of green cones will yield on an average 1½ quarts of seeds.

1 quart of seeds will weigh 1¼ pounds.

1 bushel of seeds will weigh 40 pounds.

1 ounce of seeds contains 7,500 grains.

1 pound of seeds contains 120,000 grains.

1 quart of seeds contains 150,000 grains.

375 pounds of seeds contains 45,000,000 grains.

375 pounds of seeds cost for collection $355.72.

1 pound of seeds cost for collection 95 cents.

1 quart of seeds cost for collection $1.19.

1 pound of seeds cost at dealer's prices $2.

$1.05 per pound saved in collecting our own seed.

$393.75 saved on 375 pounds of seeds.

The seeds are stored for the winter in a building near Lake Clear Junction, Franklin County, ready for our spring work. They are in paper sacks, fifteen pounds to the sack, packed in sand, well protected from mice, moisture, drying out, and other injurious conditions. The stock on hand is larger than is needed for our nursery work; but the surplus can be used to good advantage for broadcast sowing on denuded areas, or for underplanting in forests where it may seem desirable to create an undergrowth of Red Spruce. As we have such a large supply on hand, some of the seed might be distributed free to any of our citizens who may want to reforest their lands with trees grown direct from seed.

All of which is respectfully submitted.

CLIFFORD R. PETTIS.

Special Report of Forester Sterling on Chestnut Groves and Orchards.

ALBANY, N. Y., *September* 15, 1902.

TO WILLIAM F. FOX, *Superintendent State Forests:*

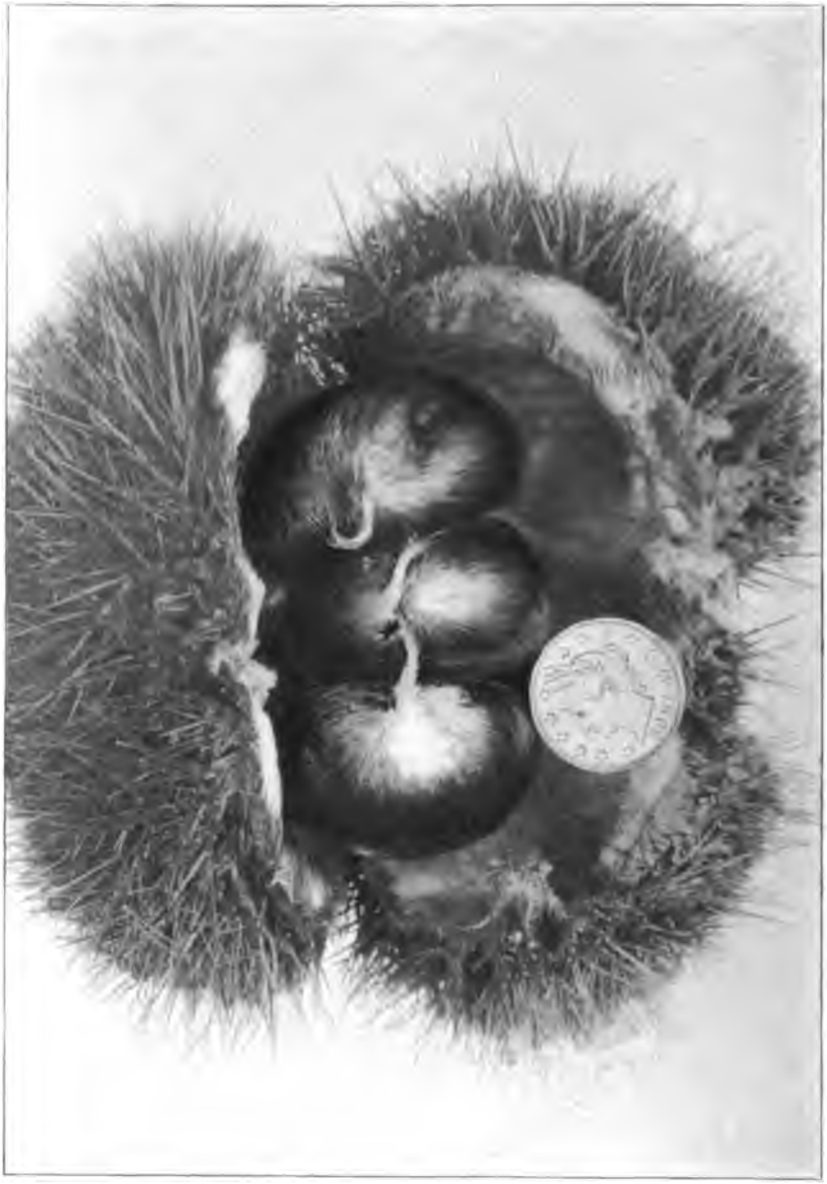
Sir.—In compliance with your instructions I visited recently several of the important chestnut groves and orchards in New Jersey and Pennsylvania, and beg leave to submit herewith a report showing the result of my investigations. Nearly two weeks' time was spent at the work, a distance of about 1,050 miles was traveled, eight groves were examined, and calls made on eleven men who have been identified with the work of introducing and propagating chestnuts in this country on a commercial scale.

The investigation was by no means exhaustive, in fact quite the contrary; because, as the work progressed new sources of information were found, references were obtained to hitherto unknown authorities, and the location of new groves and orchards were discovered. It is probable, however, that the most representative men and the most typical orchards of the region were visited, and that very little additional information as to species, grafting, and general chestnut culture would have been obtained by a more extended visit in this particular region.

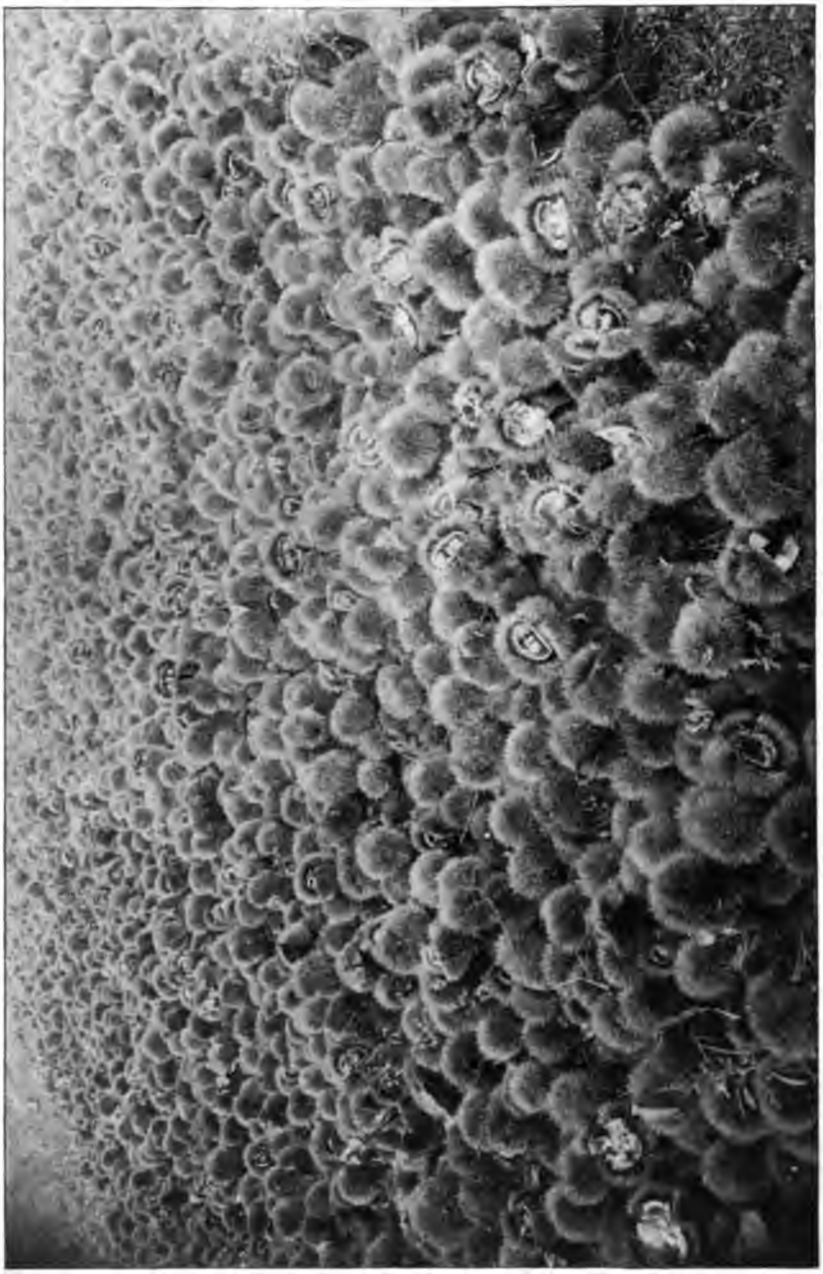
Two distinctive methods of chestnut culture are in vogue in the region. The one is the method of grafting young chestnut sprouts (coppice) with the scions of Japanese, European or native species, and depending on the roots of the old stumps and the new roots which are developed to furnish nourishment to the young shoots. The other is to grow young plants from seed, graft them in the nursery when two or three years old, and the following year set them in the field in rows about thirty feet apart each way. As a variation of this, the two or three year old seedlings are sometimes transplanted into the orchard rows before they are grafted; but this results in a loss of time because the trees must be allowed to get their root system firmly established before the scions are set, or, otherwise, they will not have sufficient vitality to withstand both the shock of grafting and transplanting.

Where the natural stump sprouts are grafted the resulting growth is called a chestnut "grove." The experiments in chestnut culture carried on in central Pennsylvania have been principally of this type. In southeastern Pennsylvania and southern New Jersey the trees are usually seedlings grown in the nursery, as described above, and set in regular rows about thirty feet apart each way. When grown in this way they are described as a chestnut "orchard."

The propagation of the chestnuts in groves by the grafting of numerous young sprouts is decidedly the most advisable, both from an economic and purely horticultural standpoint. The grafted sprouts, by virtue of the old established root system, are furnished an abundant supply of nourishment and make a surprisingly rapid growth, often bearing fruit profusely when only three or four years old. There is, too, less liability of failure in obtaining a full stand of trees, as the loss attendant upon transplanting is eliminated, while the great number of sprouts which spring up in a newly cut over



PARAGON CHESTNUTS—NATURAL SIZE.
The five-cent nickel piece is shown for comparison.



CHESTNUT BURS SPREAD ON THE GROUND TO DRY.

chestnut forest give abundant stock upon which to graft these scions. By grafting a large number of young sprouts per acre there is sure to be left, after deducting for all probable loss, a thick stand, which may be thinned as conditions require, thus furnishing a fine supply of new scions and keeping the ground continually covered, and the production, even at the outset, at its maximum.

Financially, the chestnut "grove" is to be preferred to the "orchard" for several reasons. First, the cost of cutting off the old stand and grafting the sprouts does not greatly exceed the expense of producing seedlings and grafting them in the nursery, since the chestnut timber removed is usually of value for fuel or railroad ties. Secondly, the ground which produces the sprouts is usually of little value for agricultural purposes, while in setting a chestnut "orchard" land is required which would be of considerable value for other purposes. Thus the cost of the first investment is in favor of the chestnut grove rather than the orchard; hence, from the latter it would be necessary to realize a greater income in order to pay interest on the larger capital tied up in the more expensive land. With the rough chestnut hillsides of Pennsylvania it is a question of raising chestnuts or nothing. On the fertile land of the Jersey plains, where most of the "orchards" are, it is a question of raising chestnuts, pears, apples, or other common fruit; hence, the loss in case the chestnuts fail is much greater. In the latter case chestnut culture becomes simply a branch of horticulture, and is governed by much the same rules as apply to apple and pear orchards.

When the sprouts on a worthless old hillside are grafted and made to produce a valuable crop of nuts, as well as timber, the work is surely entitled to a place as a branch of forestry, since the essential elements of the true forest are all there. Furthermore, it will partly solve the problem of reclaiming the now worthless burned and waste lands which at present are a standing menace to the surrounding forests and a lasting shame to the Yankee ingenuity which has so well solved the problem of " complete utilization " in nearly every branch of commercial activity, except forestry.

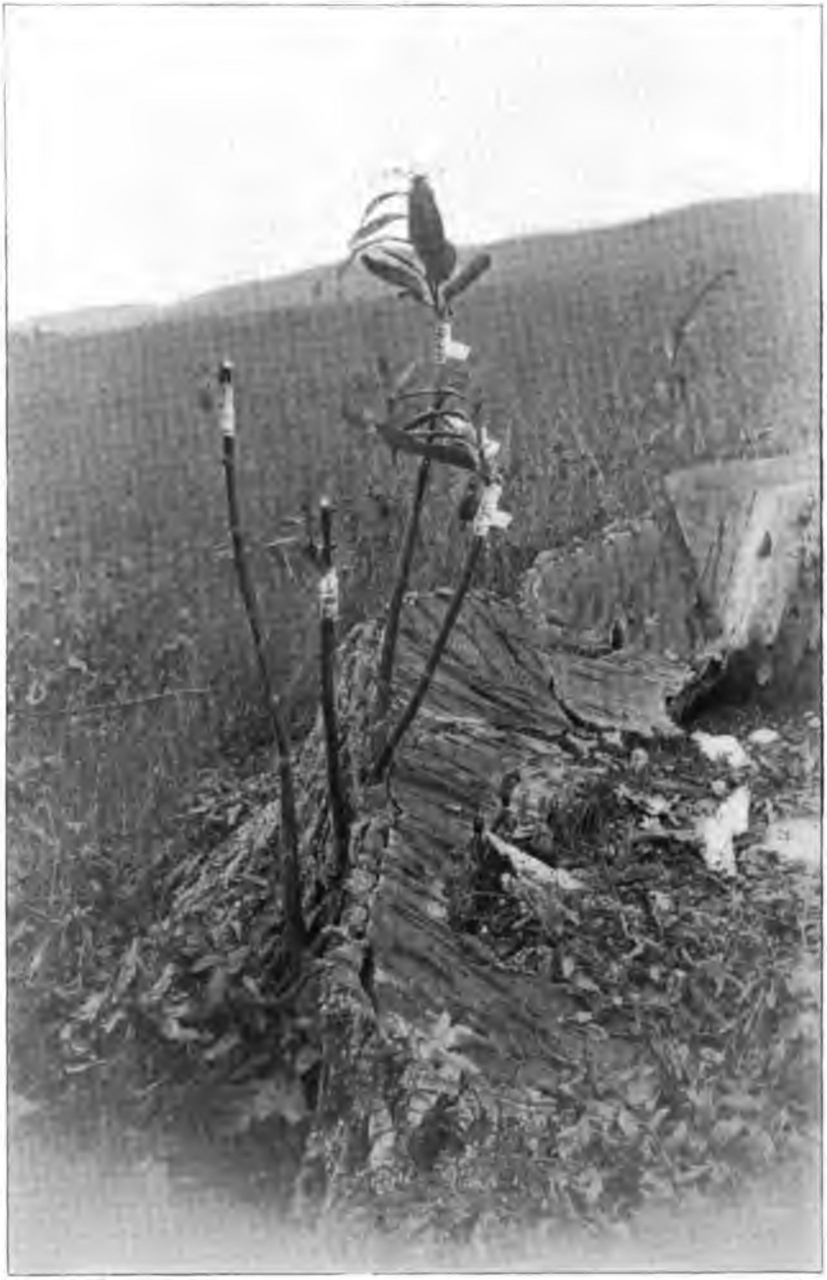
The chestnut " orchard," it is true, often has the advantage of location, accessibility to market, freedom from underbrush, and lessened danger from fire, while as an additional advantage the purely artificial orchard may be started in a region where the chestnut is not indigenous. But to the man who is after the largest returns in the shortest time, the chestnut grove which has been produced by grafting the coppice sprouts in the natural chestnut forest promises the most.

The groves and orchards visited and the condition of each, together with the plans and opinions of the owners and managers, as far as could be learned, are as follows:

THE SOBER GROVES.

The owner, Mr. Coleman K. Sober, is a wealthy lumberman of Lewisburg, Pa., a man who has long been identified with the lumbering interests of central Pennsylvania, an ardent sportsman, an advocate of forest and game protection, and on the whole a strong, energetic individual with an inborn ability to make a success of whatever he undertakes. The motive which impelled him to make a costly experiment in chestnut culture was found in the desire to reclaim the waste lands of the State, and in the belief that a properly conducted chestnut grove would be a paying business venture. The idea of grafting chestnut trees came to Mr. Sober when, as a boy, he helped his father graft apple trees on the old farm, which is now the improved country estate of which the chestnut groves are a part. There existed near the old farmhouse a large native chestnut

DISTANT VIEW OF ONE OF MR. COLEMAN K. SOBER'S CHESTNUT GROVES.



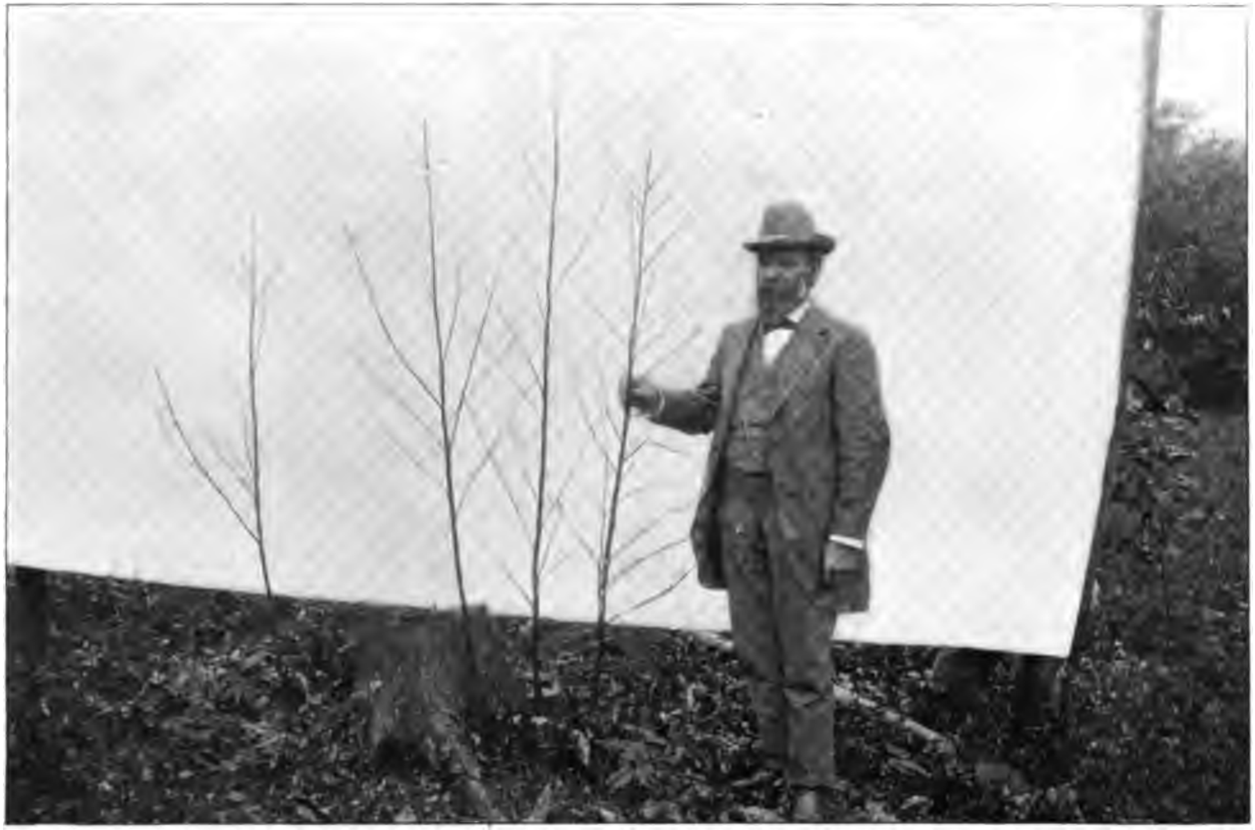
GRAFTS FOURTEEN DAYS OLD.
Shows method of wrapping with muslin.

tree, the decrepit remains of which can still be seen, that bore chestnuts of unusual size and excellent flavor. To graft scions from this tree upon the poorer native chestnut trees of the vicinity was a boyhood dream, which was always discouraged; so that the realization of the desire came only recently, and not until Mr. Sober had grown to mature manhood. Of course when the work of grafting chestnut trees was finally taken up on a large scale it was not the fine old native chestnut which furnished the scions, but rather the larger and more valuable imported or improved native varieties which were used. True to his old desire, however, Mr. Sober grafted a number of trees with twigs from the old native tree, but as yet they are not old enough to bear profusely.

The chestnut grove proper is a part of Mr. Sober's large model farm, and is divided into two detached parcels with a total area of nearly 300 acres, the exact acreage not being known. In location it is in Irish Valley about six miles from the small station of Paxinos on the Philadelphia and Reading Railroad and some eight miles from the mining town of Shamokin. The general aspect of the country is hilly, the main topographical feature being the low, broken parallel ridges so characteristic of the Alleghany range in this part of the State. The soil is a typical red shale, fertile when well cultivated, and underlaid by hardpan in the valleys, and on the hills by a shelly bed of red rock, which contains a considerable percentage of iron oxide. The country was originally covered with a dense stand of Pine (including *P. strobus* Linn., *P. rigidi* Mill., and *P. pungens* Mich.), Oak (principally *Q. rubra* Linn., *Q. alba* Linn., and *Q. pumila* Marsh.) and Chestnut (*Castanea dentata* Marsh.), with occasional clumps of Birch and Maple. The valuable pine and oak timber was lumbered out two generations ago and the chestnut more recently. The land in the valleys and on the moderate slopes has been cleared and is cultivated; but there still exists large areas on the steep hillsides, which are covered with a dense growth of coppice oak and chestnut, with a tangle of underbrush beneath. Land of this type constitutes the so-called waste land of Pennsylvania, and it was on such a hillside as this that Mr. Sober started his first grove.

At the beginning of the experiment an attempt was made to successfully graft large sprouts by the " wedge " or " cleft " graft, or to " crown graft," as is done with apple trees. Both of these methods were found to be impracticable, because of the failure of the large cut to heal over quickly and smoothly and make a rapid growth. The next trial was to cut over clean the ground which was to be grafted, care being taken to leave smooth stumps. When trees are cut in the spring there spring up from the stump and root collar sprouts, which in one year reach a height of five to eight feet, and a diameter of from one-fourth to one inch at two feet from the ground. Experience has shown that sprouts of this size are best for grafting; hence it is upon these one year old sprouts that scions are set, although when seedlings are found they are grafted also. About ninety per cent of the trees are from sprouts. To secure these strong one-year-old suckers the ground is cut over clean, all standing trees, large and small, being sacrificed and cut back so that stumps may be secured which will send up new shoots. In one case a tree seven feet in diameter at the base was cut, and although only one sprout came from its stump this was all sufficient, and was considered more valuable than the original mature tree.

Having secured a good stand of suckers, the next step is grafting them. To do this Mr. Sober employs each spring some eight or ten experienced men for a period of five weeks, which is about as



Sprouts Before Grafting.

The place where the sprout is grasped by the fingers shows the height at which it should be cut off and the scion inserted.

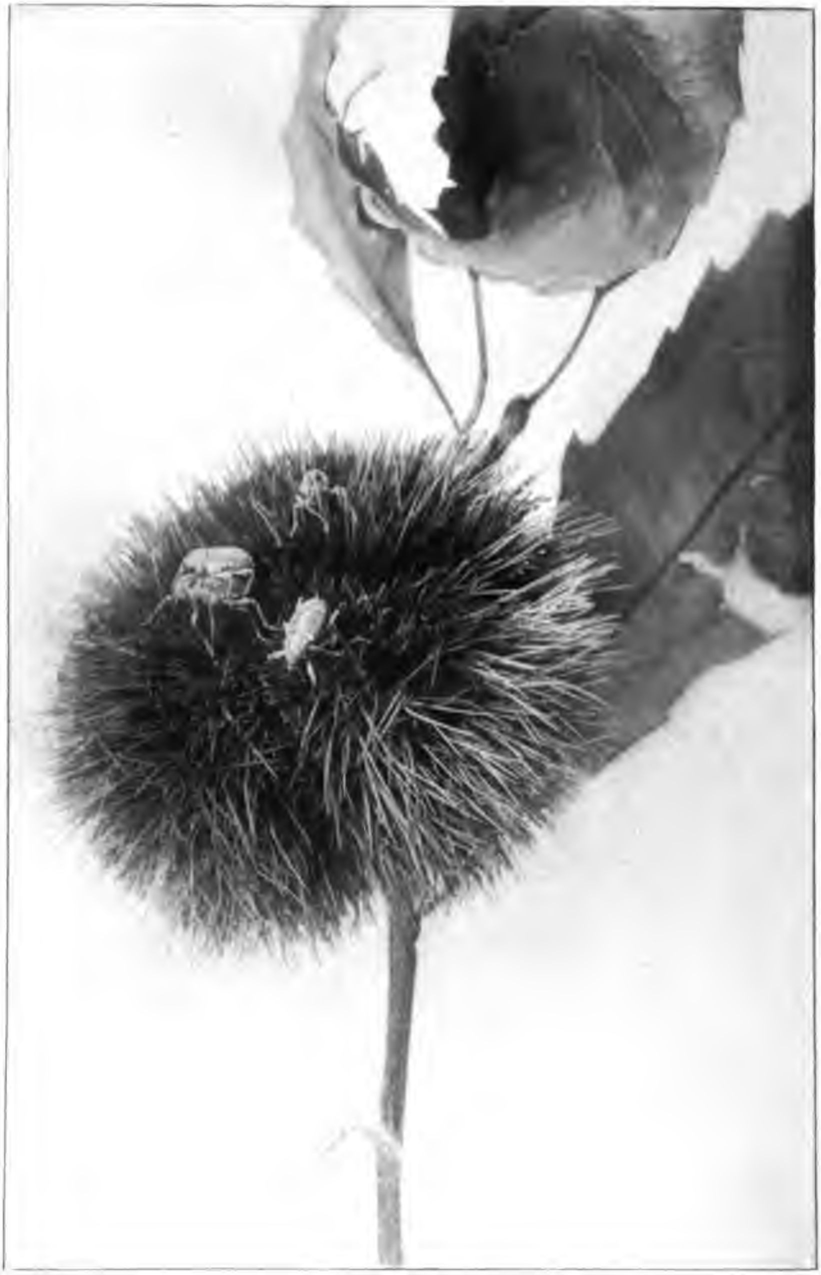
long as grafting can be successfully done. Each man puts in on the average about 250 grafts per day. Grafting can be commenced when the buds first start, but it is better to wait until a little later. May is the best month in which to graft. The "tongue" or whip graft is the method exclusively used; for experience has proved, as Mr. Sober tersely put it, that "cleft grafting is dead wrong." The scions are put in from three to four feet from the ground so as to keep the heads low, and where there is a circle of sprouts around a stump the ones which start from nearest the ground are always chosen, because they root in more readily and are less liable to damage by the wind. In a group of sprouts such as spring from one stump, only one or two are grafted, while the rest are left during the first year as a protection to the young grafts. Where sprouts are plentiful grafts are put in every ten to twelve feet, care being taken to leave no open spots or to get an unnecessary grouping of grafts. By putting in a large number to the acre a complete crown cover is sooner obtained, danger of complete loss averted, and as they begin bearing when very small, larger early returns are obtained. As the trees grow and expand the poor and crowded specimens will be removed to make room for the better trees. In grafting great care is taken, and as a result nearly all grafts live.

During the early years of the work much loss was occasioned by the wind breaking down many of the grafts during the first season. This danger has now been minimized by making the cut on all grafts very long, and by winding muslin, saturated with wax, around the newly made waxed joints of the stock and scion. The muslin holds everything firm and thus hastens the union of the cambium layers, prevents the entrance of air into the cracks in the wax caused by the expanding sprout, and finally gives mechanical support. The yearly growth of some of the young grafts is quite remarkable.

When two months old they are often two to three feet in length, while it is recorded that one specimen grew in one year a linear distance of fifty-four feet, counting the main axis and all the lateral branches and leaves. The first year's growth is inclined to assume a fan-shaped form and not form a well-rounded crown; hence it has been found advantageous to cut back the first year's growth so that only a stub three to four inches long, containing two to three buds, remains. The following year these buds will grow into a well-rounded head.

The wax used is made from an original formula of Mr. Sober's, and is as follows: 2 pounds rosin, 1 pound beeswax, ½ pound beef tallow, the whole to be melted together and worked into a wax upon cooling. Different colors were worked into the wax, and each man employed was given a distinctive color so that his work could be followed.

In the choice of species very little experimental work has been done. It was early decided that the Paragon nut was best; hence this variety alone has been grafted extensively. Investigations in other orchards, and the literature consulted, confirm this choice of variety as a wise one. Compared with the common European and Japanese chestnuts the Paragon is more prolific, less troubled by curculio, comes into bearing sooner, and has a finer flavored nut. In size, too, the nuts are equal to the best. With selected nuts thirty-two will weigh one pound, while many specimens will cover a silver dollar. The rapidity with which the Paragon will come into bearing is also astonishing. One little two-year-old graft, no higher than a man's shoulder, last year matured fifty-six burs; while a tree three to four years old will produce a pint or two of nuts. In five to six years the trees become eight to twelve feet high, with a well-rounded head, and bear several quarts of nuts annually. In



CHESTNUT WEEVIL (*Balaninus caryatrypes* Boheman).
Natural size, on an immature bur.

fact, the Paragon is almost too prolific, because a young tree is liable to bear itself to death unless held back. By averages obtained from sample quarter acres it was found that there are approximately 240 grafted trees per acre in Mr. Sober's grove at present. The total number of trees is probably not far from 75,000.

The enemies thus far encountered are thieves, wind, fire and weevils, the last being decidedly the most serious. This year the seventeen-year-old locusts entered one end of the grove but did no serious damage. The weevils are troublesome, because they are hard to combat. Mr. Sober is making a careful study of the chestnut weevils, and will succeed in reducing their ravages if any one does. His manner of fighting them at present is to keep large flocks of game chickens foraging through the groves, cut and destroy all native chestnut trees in the vicinity which might seem as feeding and breeding places for the insects, and finally he intends to set insect traps in the groves at night to catch the insect, providing that he finds the adult to be a night flying moth or miller. The insect trap is simply a lamp placed over a pan of oil and surrounded by bright tin plate reflectors in such a way that insects flying towards the light will strike against the reflectors and drop into the oil beneath. The device has been patented.

Fire is another and quite a serious danger; but fire lanes have been made around the groves, and, in addition, the main grove is so located that it can be constantly watched, thus reducing danger from fire to the minimum. Wind also does considerable damage in September when the trees are loaded with bearing burs.

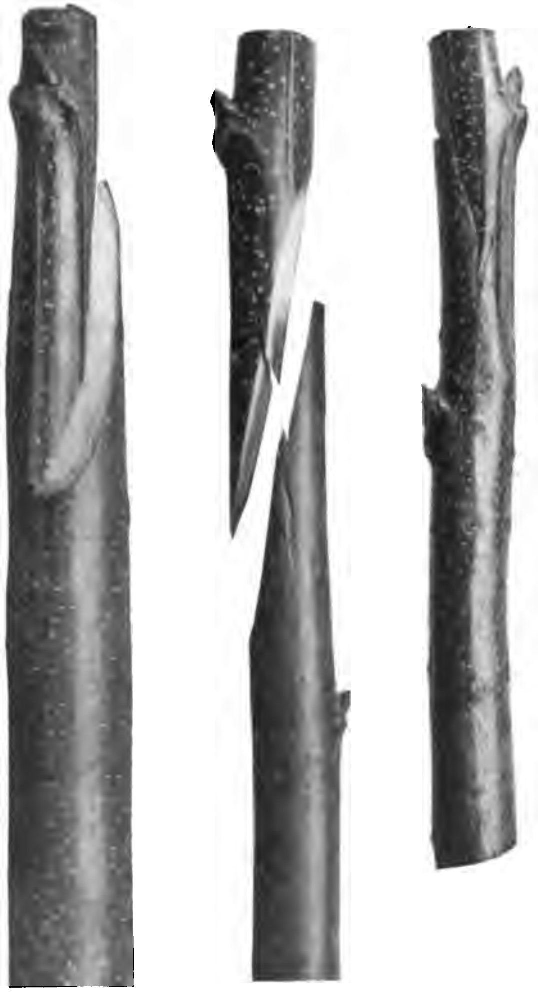
The gathering of the nuts in the fall is an interesting and, for the Paragon, a rather expensive process, because the burs do not open on the trees. The burs usually mature about October 1st, their ripeness being indicated by a change in color from green to yellow. When the nuts are ripe men are sent into the groves with baskets and bags, and armed with thick gloves they proceed to gather the crop of ripe burs, as they fall from the trees, as they would a crop of cider apples. They are then carried to an open spot and spread out to dry. The burs then open, the nuts fall out and are picked up, and the burs burned, thus destroying many worms.

Mr. Sober has decidedly the most promising grove and the best practical knowledge of the business of all visited. If no unforeseen danger arises and all goes well it is safe to predict that by his chestnut culture experiment Mr. Sober will not only have opened the way towards better conservation of waste mountain land, but, in addition, he will have capital invested in a new enterprise which will bring him large returns. The grove is being continually enlarged, from twelve to fourteen men being employed during the winter "brushing out" where the next year's grafting is to be done.

GROVE OF THE ALBION CHESTNUT COMPANY.

The next grove visited was the above, which is located about three miles from Clementon, N. J., and about fifteen miles southeast of Philadelphia, on the line of the Atlantic City Railroad. The ownership of the grove is vested in a company made up of some five or six individuals, the secretary being John Alberson, Magnolia, N. J.

The grove is situated in the rolling sandy country so typical of southern New Jersey, and contains a total area of about 150 acres. The land was originally covered with a stand of oak, pine, sassafras, locust, cedar, chestnut, and many small ericaceous shrubs. All valuable timber was removed long ago, and the ground is now covered with a stand of second growth, chestnut and oak being predominant. The grove is situated on the site of an old oak and



THE "WHIP" OR "TONGUE" GRAFT.

chestnut forest which had been cut over several times. The grafts were set on the coppice shoots, the same as in the Sober grove. The mistake was made, however, of allowing the sprouts to get too large before grafting them, and also of using the "wedge" graft. Sprouts varying in size from two to six inches were grafted by cutting the stem squarely off four to five feet from the ground and inserting two wedge grafts. The result was that the stock and scion have in many cases not united smoothly, and there is often left between the two scions a spot which does not heal over at all, but remains as a point of infection for fungi, and a source of structural weakness which lessens the resistance of the trunk to wind.

The largest of the trees are now nine years old, but the grove was grafted over three times before all grew. Hence, many of the trees are younger than nine years. In diameter they vary from three to eight inches, are from ten to fifteen feet high, and stand about sixty to one hundred per acre. All brush, logs, bushes, and other species of trees have been entirely removed from underneath the grafted chestnuts, and the ground is now covered with wild grass, brakes and huckleberry bushes. The Numbo is the favorite variety and is about the only one grown. It is a native seedling, not exceedingly large, but very bright and attractive in appearance, and is very sweet. Its great drawback is that it is not prolific. The trees were well set with fruit this year, but it was reported they had not had a full crop for five years. The objection to the Paragon was that the burs would not open on the trees, and that the expense of picking and drying them so as to secure the nuts reduced the profits. The Japanese nuts were not grown because they are too bitter to sell well.

GROVE OF THE MAMMOTH CHESTNUT COMPANY.

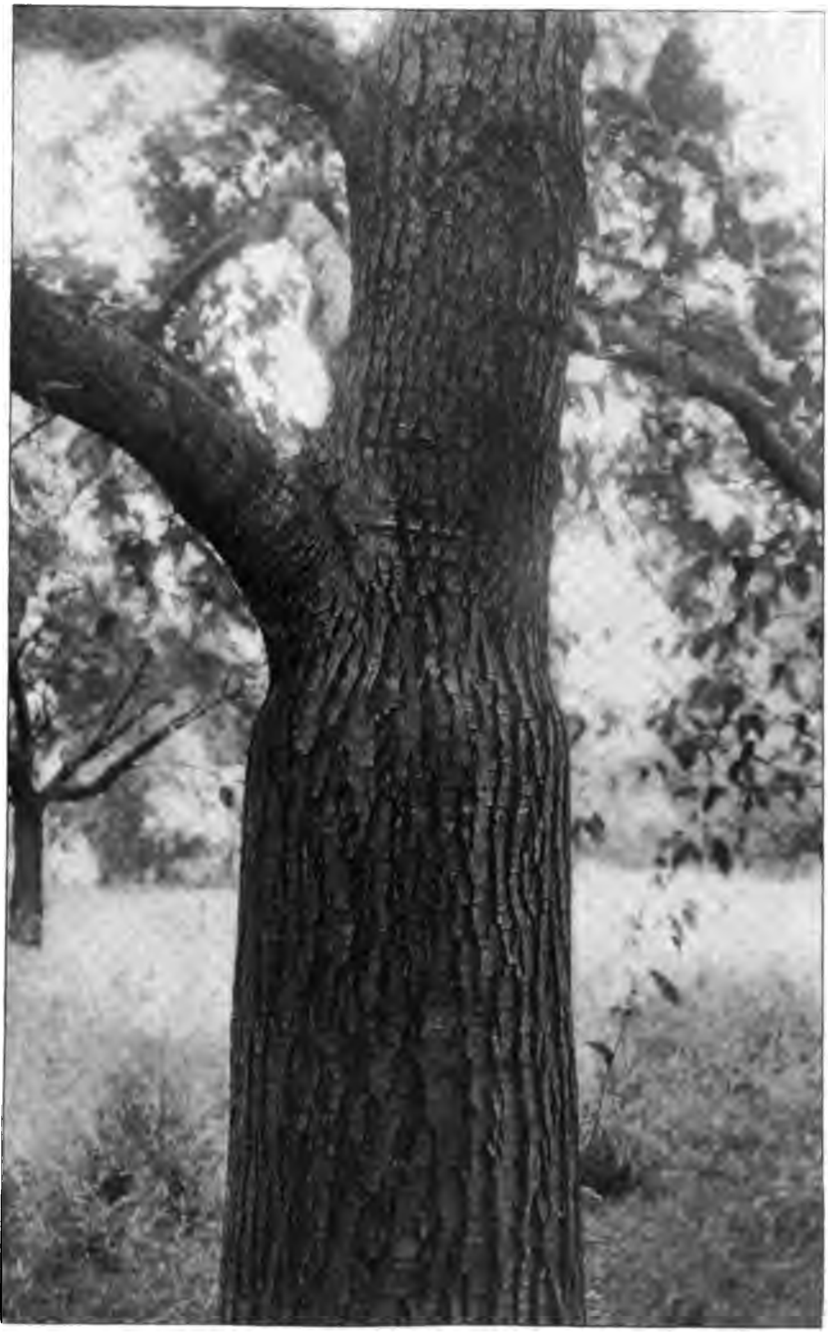
The Mammoth grove, so called, is adjacent to and in about the same condition as the Albion grove described above. The owner is Mr. Charles I. Woster, Temple Building, Camden, N. J., and the work is under the direct charge of Mr. C. Norcross, Ariel, N. J.

About 120 acres have been grafted in the same manner and with about the same mistakes as are mentioned before. Of the 120 acres only 80 have been cleared of underbrush and put into first-class shape. Wind, fire, and weevils were given as the three worst enemies.

Taken collectively the Albion and Mammoth groves are in fairly good shape, but they seem to lack the judicious care which an energetic and enthusiastic owner would put upon them. If the groves were grafted with Paragon the financial success of the enterprise would seem assured; but with the unprolific Numbos large financial returns seem doubtful.

NURSERY OF SAMUEL C. MOON.

Mr. Moon is mentioned in the Bulletin on Nut Culture, published by the U. S. Division of Pomology, as an extensive introducer and grower of chestnuts; consequently a visit was made to his large nursery, which is located near Morrisville, Pa. It was found, however, that he had gone out of the chestnut business almost entirely, although he was still interested in the subject and had a valuable fund of information, which he imparted freely. At various times both he and his father had imported European and Japanese chestnuts and had grown them in their nurseries. Many of the plants were tender and winter killed, while others, which withstood the change of climate, were not prolific enough to be of any use. The result was that their stock was constantly decreasing, and that on



Whip Graft, 21 Years Old.
The proper method of grafting.

the whole they did not find the business profitable enough to merit its continuance.

One exceedingly interesting tree on the grounds of Mr. Moon is the original Numbo seedling, a tree now probably three feet in diameter, with a broad, low symmetrical crown which probably has a spread of fifty feet. The history of the Numbo, as given by Mr. Moon, is that it is one of the seedlings imported from France or England by his father, Mahlon Moon, about 1850. Of the whole lot imported, both at this time and later, this tree turned out to be the best one out of the few good ones allowed to remain. Many scions have been taken from it, and the Numbo is now known and grown in various parts of the country. It is not a Japanese seedling as many suppose, nor is Numbo a Japanese word; it is an abbreviation of the name Magnum Bonum, which the elder Moon first applied to the variety.

In grafting chestnuts Mr. Moon has had much experience. His method is to cut the scions early, keep them dormant in a cellar or ice house until the stocks start and the buds are well swollen, which is about the middle of April. Then cut off the tops of the stocks, put in tongue grafts and wrap with waxed muslin, care being taken that the stock and scion are about the same diameter. Mr. Moon says: " I have tried grafting one year old seedlings at the collar as they stood in nursery rows; also, by taking them up and grafting on whole roots as apples are done, but without success." Budding in the ordinary way was also unsuccessful. The failure of these methods of grafting is a repetition of Mr. Sober's experiments, failure in both cases being the result.

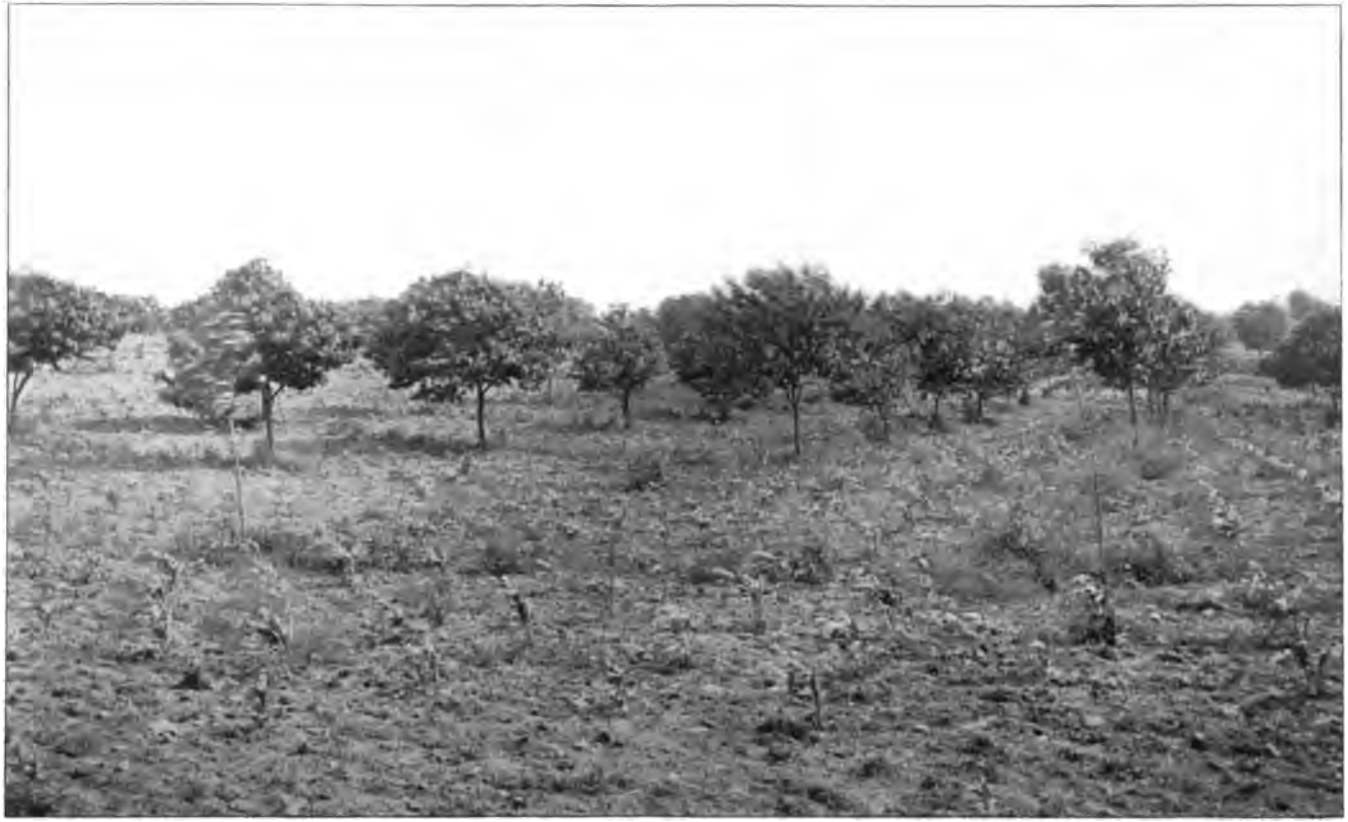
Mr. Moon has confined himself mostly to raising seedlings and scions for others, but from his experience he does not predict a great future for chestnut culture. He says that many men can be found with young orchards and groves from which they anticipate great things, but as yet their returns are only prospective.

THE COMFORT ORCHARD.

This was the first real chestnut " orchard " visited, and, although a small one, is in fine shape. The owner is Mr. Henry W. Comfort, of Fallsington, Pa., a prosperous Quaker, who is owner of a large dairy farm in the fertile and beautiful region along the Delaware River in Bucks County, Pa. Most of the land in the vicinity has been cleared and under cultivation since the days of William Penn; but an occasional grove or clump of native chestnut trees indicates that it is a natural chestnut country.

Mr. Comfort's orchard is only about an acre in extent, but it contains the largest cultivated chestnut trees seen on the trip. The acre contains fifty-six trees, all of which are seedlings, grown and grafted in the nursery of Mr. S. C. Moon. The trees were set out in 1881, and were then four years old, and two years grafted. All lived except one. Most of them are Numbos, which were grafted on native seedlings in the nursery. There is one tree of the variety Cooper and one or two European varieties. The grafting was so well done that it is now difficult on many of the trees to see the joint, and on none of the trees are there any open or decaying spots. The trees are now twenty-five years old and are from eight to fourteen inches in diameter and twenty to thirty feet high. The crowns are low and well rounded, and as the trees are only thirty feet apart the crown cover is even now almost full.

All the trees are set full this year, but in previous years the Numbo has not borne well, the Cooper and European varieties being better bearers. Even though not bearing well the orchard was said to pay better than an orchard of Kiefer pears would. The weevils



Chestnut Orchard of J. T. Lovett, Emilie, Pa.
Trees from four to thirteen years old; mostly Paragons.

had not been troublesome in the orchard as a whole, but certain individual trees were badly affected with them. Situated as it was near the farmhouse, and surrounded on all sides by cultivated fields and apple orchards, there was no danger from fire. An ice storm which occurred in April of this year did great damage to the nurseries and large shade trees of the region, especially the large white pines; but the chestnut trees seemed able to stand the ice, and were not badly broken.

LOVETT ORCHARD.

The largest chestnut orchard visited was that of Mr. J. T. Lovett, at Emilie, Pa., about five miles from Trenton, N. J. This orchard is also in the fine farming country along the Delaware River, and is a chestnut " orchard " in the truest sense of the word. It is an interesting fact that the farm upon which this orchard is located has been in possession of the Lovett family since 1680, and that they still hold the original deed bearing the signature of William Penn.

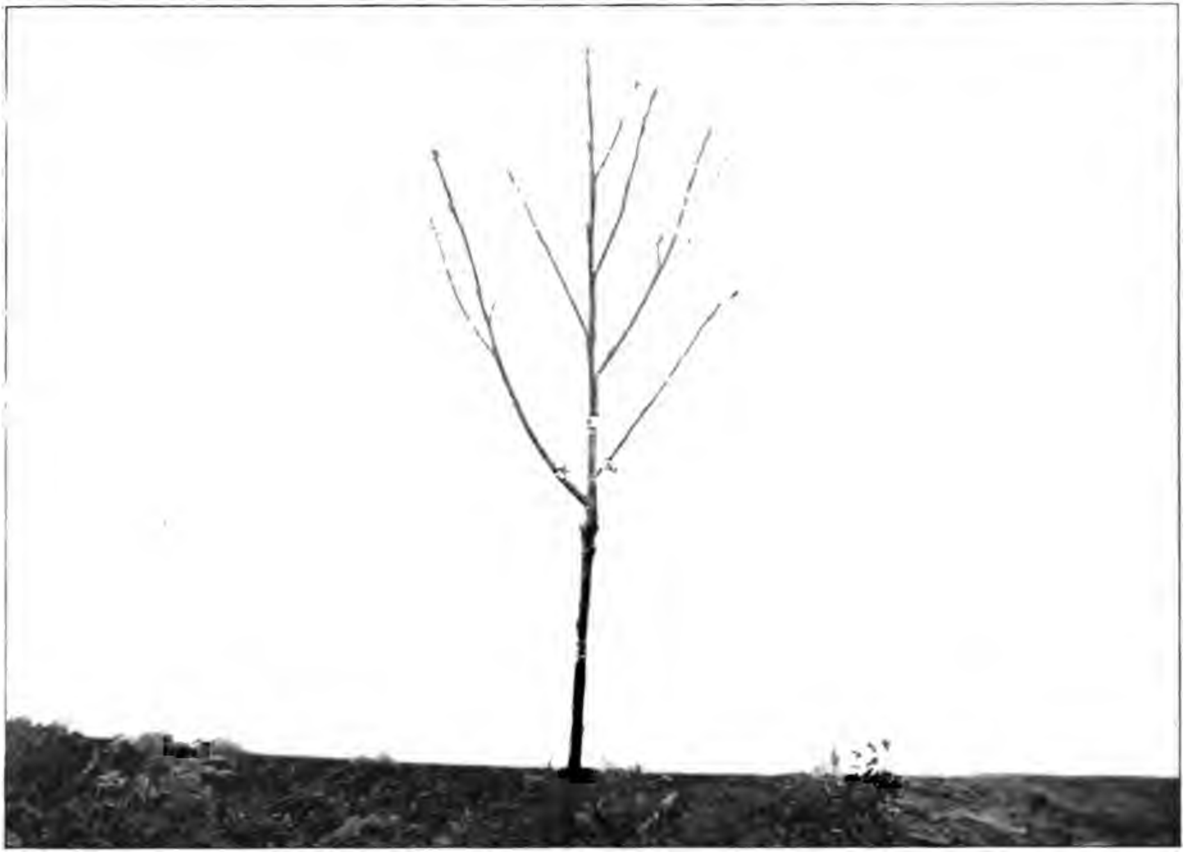
The orchard is in two distinct parcels, the total acreage of which is about twenty-two acres, containing some 1,200 trees from four to thirteen years old. The trees are nursery grown seedlings, some of them having been grafted in the nursery, but most of them were first set out and then grafted in their second or third year. The third year is best because they are better established then, and are more able to withstand the shock of grafting. They are set in rows thirty feet apart each way, and at present the ground between them is cultivated and this year was growing a crop of corn. The whip graft was the method used and it seemed very successful. It was not thought necessary to wrap the joint with waxed muslin, as ninety per cent took without this precaution. The thirteen-year-old trees are now some six to eight inches in diameter, and bear as high as a bushel of nuts yearly. The Paragon is the favorite because of its great bearing qualities. The burs are carefully picked off from the young trees, as it has been found that if seedlings are allowed to bear profusely before they are five or six years old they become stunted and are liable to die. Whether this would be true in the case of grafted sprouts is uncertain. In the fall when the burs begin to turn yellow and open a little so as to show the nuts inside they are picked just as apples would be and spread out in the sun to dry. There is a great demand for the nuts, the whole crop last year selling for $10 per bushel. Much time and expense has been expended in getting the orchard in its present fine condition, but the owner is now confident that he is on the road to financial success. Weevils are mentioned as the only serious enemy.

In addition to the grafted field trees Mr. Lovett has about 25,000 one and two year old ungrafted seedlings in his nursery.

THE COLLINS GROVE.

Mr. Arthur J. Collins, a nurseryman of Moorestown, Burlington County, N. J., started a grove of thirty acres on a denuded hillside three and one-half miles from the village some years ago. Fire ran through it three summers ago and nearly ruined it; hence, a personal visit was not made to the grove. The following facts concerning it were given by Mr. Collins:

The grove is on the site of an old chestnut forest which had been lumbered until nothing valuable was left. The young chestnut sprouts which had sprung up from the old stumps were grafted to Alpha, Paragon, Numbo, Scott, and other improved chestnuts. The Alpha and Paragon succeeded best, but none of them gave any great promise of large future crops. It was thought that several varieties should be grafted together to aid in cross fertilization, but most of the nurserymen consulted did not consider this essential.



Tree Grafted Last Spring (1902).
The tape shows where to cut it back.

Mr. Collins advised grafting low so as to secure a low crown. He also affirms that too early grafting was often a source of loss. The sap of the chestnut does not start as early as that of apples, pears, etc., and hence grafting should not be begun as early as with the succulent fruits. Mr. Collins does not consider chestnut orcharding a profitable business, because of the many sources of loss and uncertainty of the crop.

PARRY BROTHERS.

The history of the Parry Brothers' activity in the work of chestnut culture is that of a rising industry of great promise and an early failure and almost complete loss. This result came not entirely because of the failure of the chestnuts to fulfill expectations, but in a great part because through the death of William Parry, and later one of the brothers, the business fell into incapable hands and simply deteriorated from want of proper management.

Probably no one did more to arouse interest in chestnut culture and to make it a paying business than the late William Parry. For years he was engaged in importing chestnuts, propagating new varieties and improving the old. Several valuable varieties were originated in his nursery. His work, however, was rather that of supplying others with seedlings and scions than of planting large orchards himself. There are still growing in the nursery and along the roads and fences of the estate a large variety of chestnuts, among which the Scott, Hannum, Ridgely, Comfort, Fuller, Paragon and Numbo were mentioned as the best. The Comfort and Paragon were said to be much alike, and that both are comparatively free from weevils. Spraying the trees with Bordeaux mixture to prevent leaf rust was advised. Weevils are said to often destroy from twenty-five to fifty per cent of the crop. Of the Japanese species

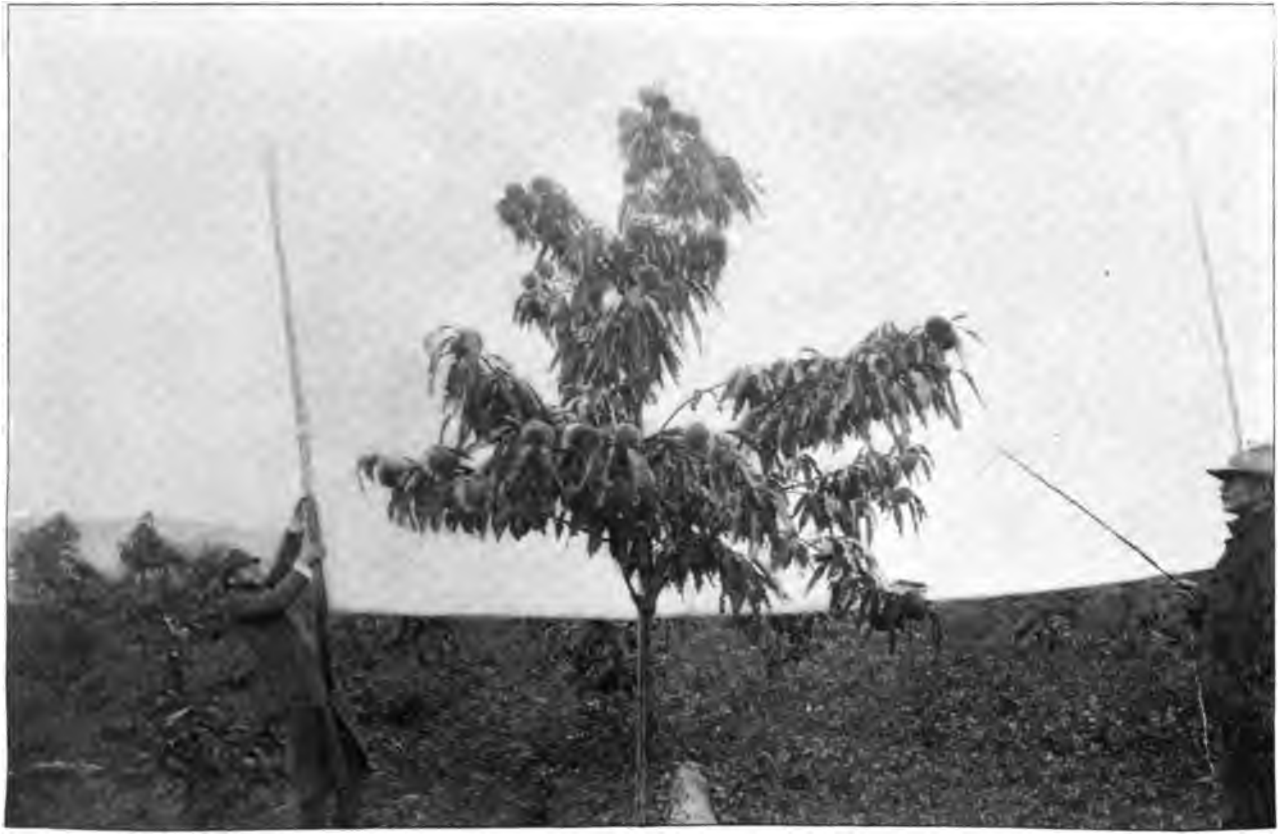
Alpha was considered decidedly the best; but the Japanese nut is not generally liked because of its poor flavor. The Scott, Ridgely and Hannum are good nuts, but rather small. A few seedlings are still grown yearly in the nursery, the price for two-year-old grafted seedlings being $90 per hundred. Crown grafting of large trees had been tried and was said to give quick and large returns.

The Parry nursery is now in charge of Mr. J. Thomas, Cinnaminson, N. J.

ORCHARD OF MR. JOSEPH WILLIAMS.

Mr. Joseph Williams, a retired nurseryman of Riverton, N. J., some years ago began quite an extensive experiment in chestnut culture on his estate on the outskirts of the town of Riverton. In the winter of 1896-7 and the spring of 1898 he set 7,500 American seedling trees, from four to six feet high, in rows twenty feet apart each way. The site was a fertile piece of cultivated land with a soil of sandy loam. In the spring of 1898 the trees were whip grafted on their branches with European and Japanese varieties. The leading shoots were cut back to two-year-old wood and there grafted, because the one-year-old shoots were not large enough to bear a scion. Only about fifty per cent of the scions lived, the loss being attributed to imperfect waxing and the use of too fine wood in the Japanese varieties. Moreover, the trees should have been allowed to stand two years before they were grafted, so that they would become more firmly established.

At present they stand from eight to ten feet high and are only one to two inches in diameter, with a very long stem in proportion to the crown. It seems very doubtful about their ever assuming a desirable form, because they were grafted so high that the stem will always remain too long and slender to support the crown. At present many of them are supported by posts to prevent the slender



A NORMAL YIELD.

stem from being snapped off by the wind. On the whole the orchard is rather unpromising, and does not give evidence that the experiment will be a successful one.

CONCLUSIONS.

From the evidence collected it seems doubtful whether the growing of chestnuts as an *orchard* crop is, under ordinary circumstances, advisable. Mr. Lovett, of Emilie, Pa., was the only man visited who seemed to have attained success in this line of chestnut culture, and this only after many years of trial and much expense. Moreover, the ultimate outcome of his experiment is still problematical, and his profits prospective rather than real.

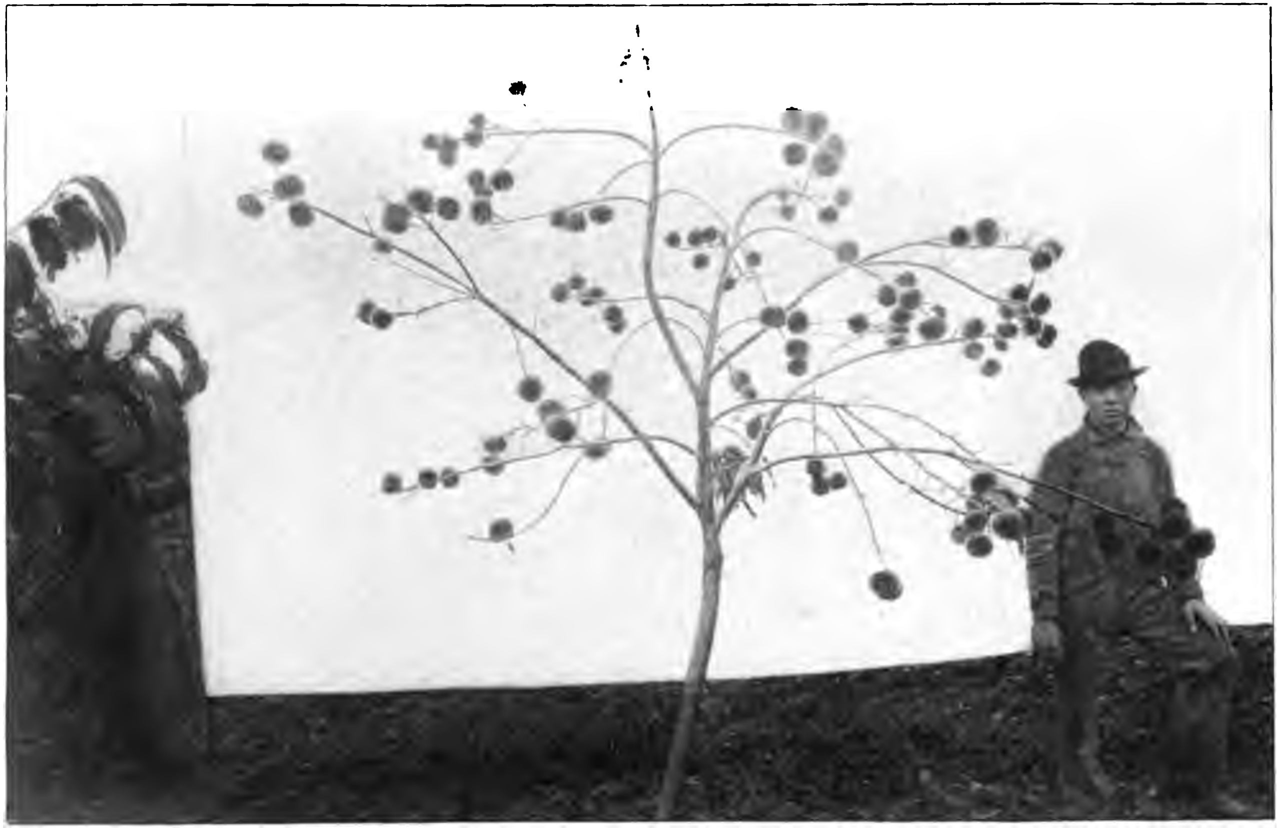
With the chestnut *groves*, however, the case is somewhat different, and it seems safe to predict that in the near future the grafting of chestnut sprouts on waste mountain land will be recognized as an important step toward forest conservation. It is true that as yet no one has carried the experiment far enough to prove its entire feasibility; but from the experiments of Messrs. Sober and Beecher in Pennsylvania, and the Albion Chestnut Company in New Jersey, it seems evident that with efficient protection and a proper choice of species the growing of chestnuts on coppice sprouts will prove a paying business. Fire and weevils are the two worst enemies of the chestnut; but it is probable that some means will be found of combating both successfully. At present the weevil lays tribute on twenty-five to sixty per cent of the crop; but even with this loss a large margin of profit is left.

The call for the nuts is at present large and is still growing. From the middle West especially comes a great call, and many dealers are always on hand to buy up the entire crop. Last year first-class Paragon nuts sold at $12 per cwt. in Philadelphia, and less than $7 has never been offered for them. With an abundant supply of nuts it is probable that new uses would be found for them and that the demand would increase. Dr. Gifford, of Princeton, N. J., is at present working on an article telling how to prepare and use the chestnut for food. In Italy the chestnut is ground into flour and is an important food product; and there seems no reason why it should not be thus used in this country.

Many mistakes have been made in grafting, and as it is a most important phase of chestnut growing, in fact the basis of success, some of the rules given by the practical men of the business will not be out of place here.

Always graft low; not over three or four feet from the ground.
Use the whip graft in preference to all others.
Remember that "cleft grafting is dead wrong."
Graft only small sprouts or seedlings (1 to 2 year olds).
Don't try "budding."
Crown grafting is of doubtful value.
Make the cut on scions and stock long.
Begin only after the sap starts in the stock.
Cut back first year's growth to get better head.
Wrap joint with waxed muslin.
Have scion same diameter as stock.
Graft sprouts from lowest part of stump.
Leave a few sprouts to protect new grafts.
Rub off all suckers that start on stock below scion.

A list of the important varieties with their characteristics might be appended, but it is deemed unnecessary because such a list can be found in Bulletin XLII of the Delaware College Experiment Station, and in a bulletin on "Nut Culture in the United States," published by the U. S. Division of Pomology. It might be stated here, however, that the general favorite with most of the growers is



FROM THIS TREE 300 YOUNG BURS WERE PICKED; 200 WERE LEFT ON THE TREE TO MATURE.

the Paragon. A list of the men, as far as known, who own chestnut groves or orchards in the Eastern United States is here appended.

Alberson, John, Magnolia, N. J.

Part owner of the Albion grove.

Beecher, J. W., Pottsville, Pa.

Has grove of 76 to 80 acres, covered with trees 15 to 20 feet apart, and with a maximum age of nine years. Principal variety is the Paragon. Has total of about 18,000 grafted sprouts and 800 grafted seedlings.

Collins, Arthur J., Moorestown, N. J.

Owns 30-acre grove, but it has been ruined by fire. Alpha, Paragon and Numbo were the principal varieties.

Comfort, H. W., Fallsington, Pa.

Small orchard of 56 trees, 25 years old, mostly Numbo.

Dasorri, R., 250 Union street, Brooklyn, N. Y.

Owns grove near West Point, N. Y.

Hallowel, J. W., Davis Grove, Pa.
Hale, J. H., South Glastonbury, Conn.

Owner and propagator of the Hale, Coe and McFarland varieties.

Harris, James S., Still Pond, Md.

Kerr, J. W., Denton, Md.

Nurseryman who introduced and improved several varieties.

Killen, J. W., Felton, Del.

Lovett, J. T., Emilie, Pa.

Owner of large orchard of some 1,200 trees. Paragon is the favorite.

Lovett, Henry, Emilie, Pa.

An experienced chestnut grafter.

Lovett Co., Little Silver, N. J.

Moon, S. C., Morrisville, Pa.

Nurseryman. Owner of original Numbo seedling.

Moon, William, Morrisville, Pa.

Nurseryman. Grower of chestnut seedlings.

Roberts, Horace, Moorestown, N. J.

Owner of small grove of fine trees, about 3½ miles from town of Moorestown.

Scott, H., Burlington, N. J.

Owns a small profitable orchard of Paragons. Forty trees last year brought him $400.

Sparks, J., Cross Keys, N. J.

Owns ten-acre orchard.

Thomas, J., Cinnaminson, N. J.

Manager of the Parry Nursery.

Williams, Joseph, Riverton, N. J.

Owns young orchard of 1,200 trees, containing both European and Japanese varieties.

Woster, Chas. I., Temple Building, Camden, N. J.

Part owner of Mammoth Chestnut grove at Clementon, N. J.

References relating to chestnut culture will be found in the following publications:

Nut Culture in the U. S. p. 76.

U. S. Division of Pomology.

Young Chestnut "Grove."
Trees six years old. Paragons grafted on native sprouts.

Bulletin XLII, Delaware Agricultural Experiment Station.

Chestnut Possibilities in Pennsylvania. p. 47.
Pennslyvania Division of Forestry Report, 1896.

The Sober Chestnut Groves.
Booklet obtainable from C. K. Sober, Lewisburg, Pa.

Garden and Forest.
Vol. III. pp. 314, 538, 532, 353 and 313.
Vol. VI. p. 13.
Vol. VII. p. 484.

Meehans Monthly.
Vol. IX. 1899, pp. 66, 155 (notes).
Vol. XI. 1901, p. 158.

" Nuts for Profit."
Booklet published by J. R. Parry, Riverton, N. J.

While engaged on these investigations I fortunately secured some interesting photographs illustrating the appearance of the chestnut groves, and showing, also, the methods employed in grafting. I submit them herewith, and would respectfully suggest that some of them be inserted in this report.

ERNEST A. STERLING.

The Fauna of the Woods.

FACTS AND STATISTICS ABOUT THE ELK, DEER AND MOOSE OF THE ADIRONDACK REGION.

In response to a continued and growing demand for information about the larger animals of the Adirondack region, the Commission has followed its usual course in collecting various facts and statistics relating to the fauna of the woods. Great care has been exercised to have the facts and figures given represent accurately the conditions as they exist, and it is believed that the camper, the sportsman, and even the resident of the Adirondack counties will find something of interest and value in what follows. The proof that the herds of deer are steadily increasing will of itself give much satisfaction, and the success that has attended the effort to restore moose to the woods will undoubtedly prove gratifying to the many citizens interested in the movement. The introduction of elk is at best an experiment, but it has thus far proved to be successful, and the people of the State are indebted to a public-spirited citizen for generous donations of these valuable animals. Many letters received by the Commission attest the pleasure which the vast army of visitors to the Adirondack region has experienced and is yet to experience from the introduction in this territory of the animals mentioned.

THE ADIRONDACK DEER.

One of the very best evidences of the value of protection is furnished by the marked increase in the number of deer secured by hunters in the Adirondack region annually. In spite of all predictions to the contrary, the herds of deer have steadily grown; and although the army of hunters is continually increasing, as shown by the heavy travel to the woods during the hunting season, the inroads made yearly have not appreciably diminished the number of these animals within the State's forest domain. In response to the continued demand of those interested in this subject, the Commission has collected, with the aid of the American and the National Express Companies, a record of the shipments made during the hunting season of 1902. These figures, and those of the two preceding years, are as follows:

Year	Carcasses	Saddles	Heads
1900	1,020	89	95
1901	1,062	103	121
1902	1,354	113	193

From the increase in the number of carcasses shipped it will be seen that, in round numbers, about thirty per cent. more deer were secured by hunters in the Adirondacks during the season of 1902 than during the previous year. By following the generally accepted rule, that four deer are killed in the woods for every one shipped out by rail,* the great increase in the returns secured by sportsmen as a result of protecting these animals will readily be seen.

The interesting statistics furnished by Supt. John L. Van Valkenburgh of the American Express Company and Supt. T. L. Smith of the National Express Company, who vouch for the accuracy of the figures given, are as follows:

SEASON OF 1902.

SHIPMENTS OF DEER FROM POINTS IN THE ADIRONDACK REGION.

Mohawk and Malone Railroad.

Railroad station	Carcasses	Saddles	Heads
Beaver River	117	2	18
Big Moose	45	2	7
Brandreths	4	......	3
Childwold	16	4	......
Clear Water	20	1	......
Eagle Bay	14	......	......

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*A large number of deer are taken out of the woods each season in wagons by farmers and sportsmen who live near the borders of the Great Forest of Northern New York; and a large amount of venison is consumed in the hunting camps, lumber jobs, hotels and by the "natives" or residents of the woods.

Railroad station	Carcasses	Saddles	Heads
Floodwood	13	......	......
Forestport	24	5	1
Fulton Chain	58	9	......
Hinckley	1	......	......
Horseshoe	2	......	......
Lake Clear Junction	7	......	......
Lake Placid	1	......	4
Little Rapids	3	......	......
Long Lake West	44	3	......
Loon Lake	8	1	......
McKeever	17	1	2
Minnehaha	9	......	......
Ne-ha-sa-ne	2	......	19
Nelson Lake	3	......	......
Onchiota	5	......	......
Otter Lake	10	......	......
Paul Smiths	11	......	7
Piercefield	31	3	7
Pleasant Lake	9	......	......
Poland	17	......	......
Rainbow Lake	....	2	......
Raquette Lake	21	5	......
Saranac Lake	6	2	......
Saranac Inn	3	......	......
Tupper Lake Juncton	64	6	6
White Lake Corners	9	......	......
Woods Lake	24	......	......
Total	618	46	74

New York and Ottawa Railroad.

Brandon	....	1	......
Derrick	29	......	3
Dickinson Center	2	......	......
Killdare	8	......	1
Madawaska	6	......	1
Santa Clara	14	......	2
Spring Cove	18	......	......
Sherman	3	......	......
St. Regis Falls	....	......	4
Tupper Lake	2	......	8
Total	82	1	19

Utica and Black River Railroad.

Alder Creek	8	......	......
Benson Mines	42	2	......

Railroad station	Carcasses	Saddles	Heads
Boonville	4	......	......
Carthage	2	......	4
Castorland	5	......	......
Glenfield	27	1	2
Harrisville	30	5	......
Jayville	3	......	......
Lowville	5	2	......
Lyons Falls	13	......	......
Natural Bridge	5	......	......
Newton Falls	74	3	3
Oswegatchie	18	4	1
Port Leyden	1	......	......
Prospect	40	1	......
Total	277	18	10

Rome, Watertown and Ogdensburg Railroad.

Antwerp	2	......	......
Canton	8	......	2
De Kalb Junction	....	......	2
Edwards	3	1	......
Emeryville	....	......	1
Limerick	1	......	......
Potsdam	36	1	......
Total	50	2	5

Fonda, Johnstown and Gloversville Railroad.

Broadalbin	2	......	......
Gloversville	7	......	......
Johnstown	8	......	......
Northville	96	13	20
Total	113	13	20

Little Falls and Dolgeville Railroad.

Dolgeville	9	......	......

New York Central and Hudson River Railroad.

Fonda	4	2	......
Little Falls	1	......	......
Total	5	2	......

Rutland Railroad.

Railroad station	Carcasses	Saddles	Heads
Malone	3	......	21
Winthrop	4	......	1
Total	7	......	22

Delaware and Hudson Railroad.

Corinth	....	......	2
Warrensburgh	....	......	2
Saranac Lake	1	......	......
Ticonderoga	1	......	3
Port Henry	24	3	6
Loon Lake	1	......	4
Stony Creek	23	......	......
Bloomingdale	1	......	......
North Creek	104	28	2
Riverside	27	......	5
Hadley	....	......	1
Caldwell	2	......	......
The Glen	4	......	......
Westport	4	......	17
Crown Point	1	......	1
Total	193	31	43

Recapitulation.

Mohawk and Malone railroad	618	46	74
New York and Ottawa railroad	82	1	19
Utica and Black River railroad	277	18	10
Rome, Watertown and Ogdensburg railroad	50	2	5
Fonda, Johnstown and Gloversville railroad	113	13	20
Little Falls and Dolgeville railroad	9	......	......
New York Central and Hudson River railroad	5	2	......
Rutland railroad	7	......	22
Delaware and Hudson railroad	193	31	43
Total shipments	1,354	113	193

From the weight of the carcasses recorded in the shipping bills of the express companies, it will be readily seen that the Adirondack deer, when properly protected, will develop a size and weight fully equal to or surpassing that of the species in any other locality in North America. The following are some of the shipments reported which seem worth noting:

Railroad station	Consigned to		Dressed weight*	Live weight
Big Moose	C. P. Floyd	Remsen, N. Y.	203	254
Eagle Bay	J. Larsehn	New York city	200	250
Hinckley	J. L. Roberts	New York city	225	281
Lake Clear Jct.	J. Mulholland	Saranac Lake, N. Y.	206	257
Benson Mines	C. Simmons	Ogdensburg, N. Y.	200	250
Benson Mines	H. Miller, Jr.	Harrisville, N. Y.	202	252
Boonville	W. A. Brown	Utica, N. Y.	225	281
Carthage	D. Mosher	Watertown, N. Y.	200	250
Castorland	Harry Waugh	Fulton, N. Y.	209	261
Glenfield	Geo. Bacon	Herkimer, N. Y.	208	260
Lowville	L. Freis	New York city	200	250
Lowville	A. G. Lewis	Buffalo, N. Y.	205	256
Lyons Falls	H. L. Smallinger	Utica, N. Y.	200	250
Newton Falls	D. Gayne	Watertown, N. Y.	208	260
Prospect	Geo. Windheim.	Utica, N. Y.	211	264
Johnstown	J. Stewart	Albany, N. Y.	200	250
Northville	J. Reeifer	New York city	235	294
Northville	C. C. Weimer	Albany, N. Y.	202	252
Northville	H. M. Bowler	Amsterdam, N. Y.	210	262
Northville	R. Christian	Amsterdam, N. Y.	210	262
Northville	J. Osborne	Johnstown, N. Y.	215	269
Dolgeville	Ralph Graham	New York city	204	255
Winthrop	F. F. Stevens	Ogdensburg, N. Y.	200	250
Otter Lake	W. E. Champayn	Corning, N. Y.	226	282
Tupper Lake	A. W. Lasher	Canajoharie, N. Y.	250	313
Port Henry	J. E. McGue	Rouse's Point, N. Y.	204	255
Stony Creek	G. A. Lawton	Hadley, N. Y.	220	275
North Creek	Mrs. Chas. Smith.	Glens Falls, N. Y.	219	273
Riverside	F. Pallarand	Saratoga, N. Y.	240	300

By adding one-fourth to the dressed weight, the live weight of the animal may be determined with reasonable accuracy.

MOOSE AND ELK.

Under the appropriation of $5,000 made for the purpose of restoring moose to the Adirondacks, the Commission will, by the time this report reaches the public, have procured and liberated in the forest a dozen of these animals. It is expected that as many more will be secured in the near future. The restrictions on the shipment of moose from other States and from Canada have made it extremely difficult to procure these animals, and carload lots are practically an impossibility. Stringent laws exist in Canada and elsewhere against the shipment of live moose at any season. Those which have been secured and placed in the Adirondacks have done well, and Protector J. Edward Ball, .who has had charge of the work of liberating the animals, reports that they are now in excellent condition. The moose were set at liberty near Uncas Station and have yarded for the winter in two places—one just south of Raquette Lake and the other about three miles east of Big Moose Lake. The report of the protector says: "The moose are doing well, and there seems to be no reason why they should not increase in the Adirondacks. They have plenty of food, and will do well if let alone." He further says: "The residents of the Adirondacks are taking great interest in the work of restocking the woods with moose, and, with the railroad employees, render all possible assistance in handling the animals." One of the moose liberated last summer was shot by unknown campers in the vicinity of Eighth Lake, and the Department is now investigating the matter. The work already done toward procuring moose, under the appropriation furnished, has greatly encouraged all those interested in the effort to secure the return of this magnificent animal to the Adirondack region.

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*As weighed and billed by the agent of the express company.

In addition to the 22 elk placed in the Adirondack forest a year ago, which were the gift of Hon. William C. Whitney, 40 others have been shipped by him from his private preserve at Lenox, Mass. This generous gift will be thoroughly appreciated by all lovers of the Adirondack forests, and entitles Mr. Whitney to the thanks of the people of the State. The elk were donated from Mr. Whitney's October Mountain estate, and were shipped to Long Lake West. Five other elk were given during the year by the Binghamton Park Commission to Mr. William Dart, of Dart's Camp, near Big Moose

Lake. They will be cared for during the winter by the Brown's Tract Guide Association and liberated in the spring. Mr. Harry V. Radford, who is an enthusiastic supporter of the plan to restock the Adirondacks with elk and moose, recently paid a visit to the woods for the purpose of estimating the number of elk now there. His figures show that there are upwards of 80, which include those liberated and those born in the forest. Both the elk and the moose are greatly admired by visitors to the Adirondacks, of which there are thousands every summer, and it is believed that these animals will thrive and become an important feature of the northern wilderness.

THE BLACK BEAR.

The same forces which united to secure the restocking of the woods with elk and moose are now interested in an effort to protect the Adirondack black bear. Reports from all sections of the forest indicate that this is a move in the right direction, and that, with suitable protection, the bear will soon multiply to such an extent as to become again an important factor in the game of the region. No estimate has been made of the number of these animals in the Adirondacks, but there is no doubt that unless proper protection is given, the black bear is in danger of becoming extinct in northern New York.

Report of the Chief Game Protector.

To the Forest, Fish and Game Commission:

Gentlemen.—I have the honor to submit the following report, showing the work of the force of protectors under my supervision, and calling attention to some of the changes which occur annually in the form of amendments to the law and to other points that may be of interest to your Honorable Board as well as to the many persons who take a deep interest in the protection of the forests and game of the State, and the propagation and distribution of fish, which has been carried on so systematically and extensively that nearly all of our once depleted waters have become profitable for commercial fishing and furnish sport for myriads of anglers.

Having been in the service for more than fourteen years, I feel like intruding a little by calling attention to some very important changes that have occurred in the work, so that recent converts to protection may know something of the darker days and the difficulties under which the small handful of protectors and the few sympathizers and supporters of the law labored at that time as compared with the present state of affairs.

THE FORCE OF PROTECTORS.

Prior to 1892 there were but fifteen protectors for the entire State, with apparently no prospect of an increase, as the market hunter, together with the net fisherman, presented such a solid front that it seemed impossible to make any headway against their opposition to better laws. But, many thanks to the few never-tiring associations and persons who could see that, with the forests denuded and the fish and game exterminated, the health and pleasure seeker would soon abandon this State for other fields, thereby entailing expense which many could not afford and which would have left the now prosperous health and sporting resorts surrounded by barren ledges and unprofitable farming land as against untold wealth at the present time. The first notable change for the better was brought about by an act of the Legislature in 1892, as that body began to see the force of the argument presented by lovers of fair play, and increased the number of game protectors to twenty. This broke the ice, although many protests were made on account of an increase in taxes. In 1895 a more liberal act was passed increasing the number to 38, which was further increased by 12 by the Legislature of 1902, making at the present a force of 50 game protectors. I must say for the benefit of persons interested, and as a compliment to the Forest, Fish and Game Commission, who have taken the utmost care in selecting the additional 12 men, that the State now has 50 game protectors who, with scarcely an exception, are bright, intelligent men, well located to carry on the work assigned them. This, one can see, is not a large force when taking into consideration the vast tracts of land which the State has in the Adirondacks and Catskills which require constant watchfulness as against trespassers, the protection of game over the entire State, the numerous rivers and lakes where incessant warfare is necessary against a persistent horde of net fishermen and dynamiters, together with the large interests the State and individuals have in oysters, clams and lobsters in the waters over which the State has jurisdiction. The entire expense for the protectors is much less than many of the second class cities of the State are paying for their police forces. It is a wonder to many how such efficient men can be secured when informed that the average protector only received $500 per year with an allowance of $37.50 per month for expenses.

ILLEGAL DEVICES SEIZED.

The table in the appendix will show the work of the protectors during the past year as to the number of nets and other devices which, while being illegally operated for the taking of fish, were seized and destroyed; also the number of actions brought and concluded.

Several cases necessarily go over from year to year, which are commenced near the close of the year, fail to be reached for trial, or are appealed to higher courts.

ACTIONS AGAINST SQUATTERS.

Many actions for ejectment have been commenced against "squatters" on State land who persist in building and otherwise trespassing. One important case was decided by the Court of Appeals in favor of the people known as Wells vs. Johnston Gibby, which settled any further question as to the State's title to a tract of land known as the North Gouverneur Tract in Oneida County. The action arose on account of the seizure and sale by the Commission of about seven hundred dollars' worth of pulpwood cut on said lot and sold to Johnston & Gibby who the Commission were bound to protect in the purchase. Wells claimed title to the land by a county tax sale of Oneida County, and this decision settles for all time any claim against land acquired by State tax sales over county sales.

THE COLD STORAGE CASE.

The noted case of the People vs. The Arctic Refrigerating Co., of New York City, which was being pressed in the Appellate Court at the time of the issuance of the last annual report of the Commission, is now in the Court of Appeals waiting its turn with other cases, and judging by the decisions of the Supreme and Appellate Courts, the people will be successful as to the major portion of their claims. The defective points in the law which affected a portion of the amount claimed by the people, was so amended by the last Legislature that it now conforms to what the courts held it should have been, and the masses of people interested in the protection of song and insectivorous birds now realize that they have a law to stand on no matter what may have been said to the contrary.

GAME LAW AMENDMENTS.

Several amendments were made by the last Legislature which materially improve the Game Law and makes possible the maintaining of actions as against the former law. One very important amendment which refers to fish and game coming from without the State now puts the Department in a position to bring and maintain actions for possession no matter where said fish and game comes from. This was not possible under the old law after the decision of the Court of Appeals in the case of the People vs. The Buffalo Fish Company, as the Court held in that case that it was not the intent of the Legislature when passing the law relative to possession that it apply to fish coming from without the State.

While continuous amendments from year to year are not advisable as a constant tampering with the law is confusing and misleading to the many people interested, I feel that a few slight changes are necessary. First: For a more uniform law as to open and close season in all counties, and make it possible for one to hunt and fish in safety without stopping to determine the county lines. Many of these laws are useless, and the benefit derived is of little or no value.

SUGGESTED LEGISLATION.

The law affecting black bass should be uniform, and not as at the present time, one law for the waters of the Thousand Islands, where the season opens six days before it does through the State generally—especially as it makes two dates in one county, viz: St. Lawrence County.

It is evident that grouse are becoming scarcer yearly, and especially this year, as last spring was so very wet and cold that it is generally believed that many broods were drowned—therefore it is recommended that the sale of grouse killed in this State be prohibited.

I would also suggest prohibiting the sale of venison killed within the Adirondack Park. This would do away with quite a few market hunters who manage to get around the law relative to transportation and make a business of hunting wholly for the market. While the anti-hounding law is working admirably and the deer are steadily on the increase, the law cannot be made too strict or severe as to taking or harboring dogs of any description in forests where deer inhabit, as it is an undisputed fact that nearly all species of dogs will follow a deer and aid in its capture. In view of what the State has expended in past years in purchasing deer to restock the Catskill region, the law ought to be amended so as to continue a close season in all the Catskill counties for at least three years.

I would also recommend that no deer be taken for at least three years in Oswego County and in all of that portion of Oneida, Lewis and Jefferson Counties lying west of the Black River railroad from Utica to Carthage and south of Carthage and Rome, Watertown and Ogdensburg road from Carthage to Richfield Junction. In this locality there is a large tract of timbered land well adapted for deer where they were exterminated many years since, but in the last few years several deer have found their way into that locality and should be protected.

The law regarding the use of nets in Raritan Bay is such that it affords no protection to the inhabitants of Staten Island and

Greater New York who are interested in angling as against non-resident menhaden fishermen—mostly from New Jersey. The law should be amended either to prohibit the use of nets in said bay, or a law passed compelling purse net fishermen to procure a license, which would give a protector some authority to board vessels to determine what fish are being taken. The law regarding a non-resident paying a license to fish or hunt in this State is not at all plain, neither does it fix an amount as a fee. Therefore, as many States charge a license fee to non-residents, we would recommend the law being amended so as to be more explicit and to also specify the amount of the fee.

As in my last year's report, I would recommend that if game or fish is found in the close season outside of warehouses where it can be bonded under the present law, that a law should be enacted declaring that if a seizure is made, after the articles have served their purpose as evidence, they should be turned over to the nearest charitable institution instead of being allowed to waste—thereby giving the officer making the seizure or the Court before which it had been used as evidence, something definite under which to act.

I must continue, as in the past, to commend the work of the local protective associations throughout the State, and assure them that the assistance rendered is ever appreciated. I would also express the gratitude of the Department for the assistance which is rendered by the express companies who are ever ready to assist in detecting violations by persons who persist in illegally shipping fish and game.

Respectfully submitted.

J. WARREN POND,
Chief Game Protector.

Report of the General Foreman of Hatcheries.

To the Forest, Fish and Game Commission:

Gentlemen.—I herewith present my report for the year ending September 30, 1902, showing the number of fish distributed by the Commission, the number of each kind of fish and the size, from which hatchery or hatching station distributed, and where the fish were planted.

There were 1,459 applications received by the Commission during the year and 240 carried over from the previous year, making a total of 1,699 to be filled during the year. Of these, 1,078 were filled, 94 rejected for various reasons, leaving 527 on hand at the close of the year.

No applications for black bass have been filled during the year, but several thousand have been taken out of the canal and waterworks reservoirs at Rochester and planted in nearby waters.

The policy adopted by the Commission of rearing fingerling and yearling fish for distribution has been followed throughout the year, and every effort has been made to increase the output of these sizes. The results of planting fingerlings have been particularly satisfactory and productive of good results.

IMPROVEMENTS MADE.

An additional pipe has been put in at the Adirondack hatchery which will more than double the capacity of that hatchery for rearing fingerlings. The output from that hatchery has been much larger than ever before.

I would suggest that the plan adopted for improvements at that hatchery be also adopted at the Fulton Chain hatchery. This would give an opportunity for a larger distribution in a section of the Adirondacks where the fish are much needed.

The increased number of applications for fingerling fish will make it necessary for the Commission to continue increasing the facilities for rearing fingerlings at each of the hatcheries. Very few applications are made now for trout fry.

Spring Creek at the Caledonia hatchery has been thoroughly dredged and cleaned during the past year, and I have every reason to believe that the results will be much more satisfactory during the coming year.

During the past year a new hatchery building, 60 by 22 feet, on Whortleberry Creek in Cold Spring Valley in Margaretville, Delaware County, has been built. The stream is a never failing one of pure spring water, with a very even temperature throughout the year. About 120,000 trout have been reared during the past summer, a part of which have been distributed, and the balance of about 50,000 was carried over for yearlings. This hatchery is located in a part of the Catskills where there are numerous trout streams and water suitable for trout, making it an admirable location for distribution. The result of the work of this hatchery will be very evident in a year or two, and cannot help but add to the attractiveness of the Catskill region. An expenditure of three or four thousand dollars for the purpose of constructing rearing ponds, races, dams and ponds would add very much to the efficiency of the hatchery, and the output could be increased about four times.

REARING BLACK BASS.

The season at the Oneida hatchery has been most satisfactory. I would suggest that two thousand dollars be expended at this hatchery for the purpose of constructing suitable ponds and races for rearing black bass, which are much sought after from all sections of the State. I know of no better place for the purpose, as the waters are suitable for black bass and the grounds adapted to the construction of the necessary ponds and races.

The Beaverkill hatchery has been closed, as the location was not suitable for a hatchery, the water being insufficient. All of the implements, cans, etc., have been transferred to the Delaware County hatchery. The building is of good construction and in good condition, and I would suggest that the Commission make some disposition of it as soon as possible.

The output of the Cold Spring hatchery has been of the usual numbers. The quality of the fish sent out has been of the best. A new heater should be put into the hatchery and some repairs should be made to the foundation of the building.

The usual number of fish have been reared and sent out from the Pleasant Valley hatchery. The results of the work of this hatchery are apparent in Keuka Lake, where fishing during the last two or three summers has been better than in any other waters of the State.

THE MASKALONGE SUPPLY.

The work at the Chautauqua Lake hatchery has not been as satisfactory as I could wish. The spearing of maskalonge through the ice in the winter will sooner or later completely deplete the lake of maskalonge. I have been informed by reliable persons that thirty tons of these fish were killed with spears last winter. Of course, there can be but one end if such a slaughter continues. You will note from a previous report that the number of fry taken from Chautauqua Lake each year decreases very materially. It is to be regretted that the law permitting spearing cannot be repealed.

The Sacandaga hatchery is not well located and the water supply is not what is necessary to show good results under the policy adopted by the Commission, i. e., rearing fingerlings. A small expenditure of money for the construction of rearing ponds on some suitable spring brook a few miles from a railroad station, would show much better results with the same cost of maintenance.

The United States Commission has granted every request we have made, and thanks are returned for assistance rendered.

Every effort has been made to increase the output of cheap food fish, and the figures will show the result in numbers planted. The result of stocking the larger bodies of water of the State and Lake Ontario must show satisfactorily in the very near future.

The usual exhibit was made at the State fair. These exhibits are inexpensive and always prove very instructive and attractive. I would suggest that they be continued.

The increase of carp in some of the best fishing waters of the State still continues, and there appears to be no way of stopping it. They are a very difficult fish to exterminate.

Few, if any, complaints have been made of the messengers who delivered fish to the applicants, and very few fish have been lost in transportation. The few losses in every instance proved to be due to the fault of the applicant who failed to meet the fish promptly at the time specified.

The policy of the Commission of beautifying the grounds about the hatcheries and making them attractive has been adhered to strictly. The expense is slight, as nearly all the labor is performed by the regular employees of the hatcheries. The grounds at the Caledonia hatchery might well be called a park, as they are extensive and well arranged. The flower beds are large and very attractive, and it is a popular resort for a large number of people during the summer months.

The grounds at the Cold Spring, Adirondack and Pleasant Valley hatcheries are small, but are made attractive with well-kept lawns, numerous flower beds and shrubbery.

MONGOLIAN PHEASANTS.

The rearing of Mongolian pheasants is still carried on at the Pleasant Valley hatchery at a very slight expense to the

State, and the birds are distributed to applicants as usual. Reports from various localities indicate that the pheasants are thriving and that they are highly valued by those who receive them and who, in every case, pay careful attention to their increase. The distribution has been as follows for the year ending September 30, 1902:

Date.	Name of applicant.	Residence.	Cocks.	Hens.
April 1.	P. F. Foley	Elmira, N. Y.	3	3
1.	C. W. Hatch	Lockport, N. Y.	4	4
1.	John D. Wilken	Middletown, N. Y.	2	2
1.	Dr. Latta	Charlotte, N. Y.	2	2
1.	Frank O'Brien	Shortsville, N. Y.	2	2
1.	E. B. French	Middleport, N. Y.	2	2
1.	Buffalo Park Com	Buffalo, N. Y.	0	4
1.	Thomas E. Marsh	Castile, N. Y.	4	4
1.	R. P. Coykendall	Hemlock, N. Y.	2	2
1.	Henry S. Ostrander	Knowlesville, N. Y.	2	2
1.	J. W. Alverson	Ellington, N. Y.	3	3
1.	Fred L. Seager	Randolph, N. Y.	2	2
1.	G. B. Waite	Leon, N. Y.	2	2
1.	Thomas J. O'Donohue	New York, N. Y.	1	3
1.	J. R. McLaren	Troy, N. Y.	3	3
1.	G. Shelters	Kennedy, N. Y.	2	2
1.	C. H. Jones	Chazy, N. Y.	3	3
1.	W. N. Gardner	Glenora, N. Y.	1	1
1.	C. H. Knipps	Elmira, N. Y.	2	2
2.	John Rapelye	Hopewell Jun., N. Y.	2	2
2.	W. H. Fallett	Watertown, N. Y.	5	5
2.	E. Buchans	Brown Station, N. Y.	2	2
2.	Luther Hasbrouck	New Paltz, N. Y.	1	1
2.	J. Freston	Milton, N. Y.	3	3
2.	C. W. Clark	Oriskany Falls, N. Y.	2	2
2.	George W. Smith	Watertown, N. Y.	1	1
3.	J. H. Hitt	Margaretville, N. Y.	2	2
3.	Hon. Wm. W. Everett	Croton Falls, N. Y.	1	4
5.	Brown Bros	Despatch, N. Y.	2	2
7.	John Helbock	Redfield, N. Y.	4	4
10.	C. W. Hatch	Lockport, N. Y.	2	2
10.	J. H. Hitt	Margaretville, N. Y.	2	2
10.	J. W. Feeter	Highland, N. Y.	3	3
16.	W. S. Gavitt	Lyons, N. Y.	5	5
16.	Ray Tomkins	Elmira, N. Y.	4	4
16.	James R. Francis	Milton, N. Y.	2	2
18.	W. E. Shaeffer	Lockport, N. Y.	1	1
18.	James A. Gilmore	Dexter, N. Y.	3	3
18.	V. R. Kellog	Watertown, N. Y.	3	3
18.	E. E. Loll	Malone, N. Y.	2	2
21.	J. W. Feeter	Highland, N. Y.	0	2
24.	Arthur L. Hatch	Lincoln, N. Y.	3	3
28.	John Yarrow	Ellenville, N. Y.	3	3
May 12.	E. I. Rice	Syracuse, N. Y.	0	2
June 13.	Forest, Fish and Game Commission	Caledonia, N. Y.	12	0
	Total		112	113

This shows a total distribution of 225 birds and a remainder on hand of

Old birds	75
Young	234
Total	309

In conclusion your attention is called to the very liberal courtesies extended to the Commission by the railroads of the State, particularly the New York Central and Hudson River Railroad, the Ontario and Western, the Delaware and Hudson Company, and the Buffalo, Rochester and Pittsburgh Railroad, for transportation furnished free to the State fish car and to the messengers in charge of the fish and in returning the empty fish cans.

Respectfully submitted.

RICHARD COTCHEFER,
General Foreman of Hatcheries.

Fish Distribution.

SUMMARY FOR THE YEAR ENDING SEPTEMBER 30, 1902.

Brook trout fry	1,419,000
Brown trout fry	870,000
Rainbow trout fry	17,000
Lake trout fry	1,425,000
Brown trout fingerlings	102,000
Brown trout yearlings	23,000
Brook trout fingerlings	497,300
Brook trout yearlings	60,320
Rainbow trout fingerlings	95,500
Rainbow trout yearlings	61,106
Lake trout fingerlings	221,350
Lake trout yearlings	113,550
Brook trout, 2 to 5 years old	1,640
Grayling trout fry	25,000
Black spotted trout fingerlings	65,000
Black spotted trout yearlings	24,750
Tom cods	27,000,000
Frost fish	3,720,000
Maskalonge	2,210,000
Pike perch	52,753,000
Whitefish	31,781,000
Shad	6,159,000
Black bass (adult)	10,000
Rock bass (adult)	14,000
Perch (adult)	1,000
Red throat fingerlings	3,000
Total	128,672,516

Report of the Superintendent of Shellfisheries.

To the Forest, Fish and Game Commission:

Gentlemen.—Though frequent treatises upon the shellfish industry of this country have appeared in print and from time to time articles of considerable value concerning this subject have been produced, it remains true that the public generally and particularly those who reside at points remote from the seacoast have but faint ideas of its relative importance. Next to the State forests, which conserve the rainfall over a vast area and constitute the reservoirs which equalize the flow of our mountain streams and great rivers, preventing alternate floods and droughts, and preserving the navigability of our waterways, so bringing continued prosperity to commerce and with regularity watering the thirsty land, comes the shellfish industry in importance among the subjects under the care of the Forest, Fish and Game Commission.

The State of New York years ago adopted a policy calculated to foster and encourage this industry which, with the threatened exhaustion of the natural beds of oysters and clams, bid fair to continue in but a languishing condition. The result of this system was at once apparent, and so rapidly did the business respond that at a net outlay of little more than five thousand dollars per annum from the State treasury, a delicious food product valued at many millions of dollars is annually gained for the entire people and is supplying an excellent and cheap item of diet at a time when all other food stuffs have materially enhanced in price to the consumer. It is one great industry which has not been taken over by a trust, though many attempts have been made to control it, with the result that never have oysters been cheaper than at the present time. The oyster planters' business is at best uncertain and precarious. From the moment the beds under the waters of our sounds, bays and rivers are cleaned, scraped and prepared and the seed planted, until the mature bivalve is dredged for market, the work is experimental. A severe wind from an unfavorable quarter with its incidental high waves and shifting sands may in a few hours blot out the investment and labor of the year. Starfish may swarm over a well-planted and well-tilled bed and leave scarcely a living oyster behind. The borer and periwinkle perform their deadly work, and in addition to these known agencies of destruction, there are conditions of water, etc., as yet not understood (as during the present season), which materially affect the output.

THE OYSTER CROP.

The crop of the present season has been short, though unimpaired in quality, it being stated that the quantity of oysters marketed does not exceed, in bushels, the amount of seed oysters planted. The reason of this condition is obscure and cannot be explained by the planters, who in consequence of the poor supply have sustained severe loss, and were it not for the favorable system maintained by the State, many of them would have been forced out of business. About once in from five to seven years there occurs in New York waters an abundant set of young oysters. The last extensive set was in the summer of 1899, and in its abundance was altogether unprecedented. As the oyster requires from three to five years to mature, a few years of plenty follow each general set of young oysters to those planters who industriously cultivate their grounds and are fortunate enough to escape all or most of the many dangers attendant upon the occupation.

The liberal policies of the States of New York and Connecticut in dealing with the shellfish planters have been imitated by other States with like excellent results. Even the States upon the Pacific coast have been giving much attention to the subject. State Fish Commissioner Kershaw, of Washington, is quoted as having said, "Eastern transplanted oysters are coming to the front everywhere. People who never investigated the subject do not know the importance of this fishery question. It is now one of the four great industries of Washington, and ranks with coal, lumber and wheat as a money producer. The oyster business will in my opinion soon become more important than other fisheries."

SHELLFISH CULTURE.

It may be of interest to describe here something regarding the men engaged in the shellfish business and of the methods used by them in this odd style of farming.

There are two classes of oyster planters: The first is represented by the poor bayman who, without capital, cultivates a small piece of ground by his individual labor, with possibly the assistance of some member of his family or of a similarly situated "partner." There are many hundreds of these who, by arduous toil, while subjected to constant hardship and exposure, manage to wrest from the sand and mud of our bays and harbors a frugal livelihood for themselves and families. The numbers of this type are constantly increasing. Second, the planter with capital sufficient to enable him to use every device and appliance necessary or convenient to large operations, including the employment of well-manned steamers equipped with steam dredges, starfish mops, etc., together with extensive oyster houses where oysters are opened or otherwise prepared for shipment and from whence the product is sent throughout the country and indeed to all parts of the civilized world.

In commencing, or upon enlarging his business, the first care of the planter is to select a tract of land under water which he believes to be unappropriated and suitable for cultivation, marking out the boundaries by stakes or buoys; he then consults the maps and records in the Shellfish Department of the Forest, Fish and Game Commission for the purpose of determining that the lands in question are open to entry. He is now prepared to make his formal written application for a lease from the State, for which blank forms are provided by the Department, giving, without actual survey, the best possible description of the ground, making oath that the same has not within five years produced naturally sufficient oysters to enable a man by taking them up to make a living, and that he intends, in case a lease is granted, to use the lands for the purpose of shellfish culture only. The application is thereupon filed and advertised during three weeks by posting a notice in each of three places, to wit, in the shellfish office, in the post-office nearest the location and in the office of the town clerk of the town in which the tract is situated, the time and place of sale of the grant being indicated in the notices. At the expiration of the period of advertisement a certificate is prepared, signed and filed by the clerk of the shellfish office that no objection, or that objection, as the case may be, has been made to the granting of a lease. If no valid objection has been received within competent time, the Superintendent of Shellfisheries and the Surveyor of Oyster Lands unite in a certificate (they having made any necessary investigation of the ground) that the tract is not, or does not include, a bed of oysters of natural growth. At the shellfish office, upon the appointed time, the grant of the lease of the land for the purpose of shellfish cultivation is offered at public auction and is awarded to the highest bidder, the minimum price being twenty-five cents per acre per annum. After the lease has thus been granted, the land is carefully surveyed and the boundaries marked by the State Surveyor of Oyster Lands, who plots the tract upon the maps of the office and furnishes an accurate description for the purposes of the deed of lease which is then prepared, executed by the Commission and delivered to the lessee. Only inhabitants of the State may become original lessees or hold by assignment of lease.

In certain localities the law permits what are called perpetual leases or franchises of land under water for shellfish cultivation.

THE YEAR'S BUSINESS.

During the past year one hundred and twenty-five applications were received for shellfish lands. Of these applications eight were withdrawn, some of them covering ground for which previous applications had been made. Of the remaining applications the lands included in one hundred and fourteen have been leased to the highest bidders, and three are now in process of advertisement. Thirteen hundred and seventy-two and four-tenths acres, to be added to the total of lands previously awarded, are included in these one hundred and seventeen applications. The total of lands held under lease and franchise by shellfish cultivators now amounts to twenty-seven thousand two hundred and fifty-two acres. The lands applied for during the past year are under the waters of Long Island Sound, Raritan Bay, Pelham Bay and Jamaica Bay.

Mr. Charles Wyeth, the Surveyor of Oyster Lands, with an experience of twelve years in this office, has carried forward during the year the surveys and maps of the Department, a work commenced fifteen years ago under the charge of Hon. Eugene Blackford, then Commissioner of Fisheries.

During the past few years the jurisdiction of this Department has by law been extended to the lands under the waters of Pelham Bay. In Hempstead Harbor and Manhasset Bay, it has been contended that the lands are controlled by the respective towns. The Attorney-General of the State has, however, examined the questions carefully and advised that the jurisdiction is in the State.

The effect of this enlargement of jurisdiction has been to extend the coastline, adjacent to State shellfish lands, to over two hundred and ten miles. Along this entire distance it is necessary to maintain signal monuments which constitute the basic points of our system of hydrographic surveys. From these the necessary triangulations are made and permanent maps prepared by means of which the individual oyster tracts are definitely located.

LOBSTER FISHERIES DISPUTE.

There has been no material change since my last annual report in the position of the residents of the village of Noank in the State of Connecticut, who claim the right to fish for lobsters in the waters of "The Race" in this State; the following correspondence between the Superintendent of Shellfisheries and the Attorney-General of the State of Connecticut will, perhaps, make clear the present status of the matter:

NEW YORK, *July* 28, 1902.

Hon. CHARLES PHELPS, *Attorney-General, Hartford, Conn.:*

Dear Sir.—About two years have passed since the case of The People vs. Morgan was instituted. At that time it was claimed upon the part of the Noank lobster fishermen that they possessed a prescriptive right to fish for lobsters in the waters of "The Race," southwest of Fisher's Island, in this State. This right has not been established, though from time to time it has been said that the

Connecticut fishermen would institute proceedings to test the question. The only proposals looking to a solution of the matter have proceeded from this Commission, which in the fall of 1900, in a spirit of heartiest amity, suggested reciprocal legislation upon the part of the Legislatures of the two States, which suggestion was embodied in a recommendation to the New York Legislature of 1901.

Mr. David Welch, who at that time represented the Noank people as their attorney, undertook to draft a proposed law for adoption in both States, which this Commission promised to recommend for enactment in the State of New York. Upon consulting with his clients, Mr. Welch gave up the idea of reciprocity, and reported that the passage of such an act by the Legislature of Connecticut at that time would be "an utter impossibility." It does not appear that the question is any nearer being solved than at the beginning.

There is nothing pending upon which this Department can act, and as numerous complaints are made that our shellfish non-resident law is not properly and equally enforced, we cannot with fairness ask our protectors to overlook violations.

I beg to assure you of our most friendly disposition and entire readiness to take up any promising measure which you may propose and which will involve not merely inaction by this Department in the execution of the law.

Appreciating your many courtesies, I am with kind regards, yours respectfully,

B. FRANK WOOD,
Superintendent of Shellfisheries.

STATE OF CONNECTICUT:

ATTORNEY-GENERAL'S OFFICE,

HARTFORD, *July* 30, 1902.

Hon. B. FRANK WOOD, *State Superintendent of Shellfisheries, No. 1 Madison Avenue, New York, N. Y.:*

Dear Sir.—Your favor of July 28th, concerning the matter of the Noank lobster fishermen, is received.

I regret with you that results in the adjustment of the difficulties appear to have been delayed. I hope now, however, that some progress will be made at an early date.

The services of Mr. Hadlai A. Hull, a prominent lawyer of New London, have been secured to bring the matter, if possible, to a speedy and amicable termination. Mr. Hull's location and experience, I understand, will be of special advantage to all parties concerned. I received a telephone message from him on Monday that he was about to have an interview with your Mr. Overton, and consequently I sent him a copy of your letter of July 28th, and you will no doubt hear from him personally or through Mr. Overton.

I realize your position in the matter and I desire to acknowledge my appreciation of your most friendly disposition and continued courtesy concerning the subject in question.

Thanking you for past favors, I remain, very truly yours,

CHARLES PHELPS,

Attorney-General.

It has been customary to distribute annually from the State Hatchery at Cold Spring Harbor, in the waters of Long Island Sound, from two to three million young lobsters. During the past year this work was necessarily abandoned as the Department had no boat which could be used for the purpose. The naphtha launch belonging to the Commission not being a seagoing craft was taken from the waters of the coast and is now in use upon the inland waters of the State. In many directions the work of this Department has been hampered by lack of a suitable boat, and it is hoped that one may be provided for use upon our coast and bays. Such a boat would be constantly employed in doing necessary work.

THE MENHADEN CATCH.

The Fisheries Company reports that the menhaden catch during the season of 1902 has amounted to 1,375,786 barrels, from which was obtained 55,000 barrels of oil, 11,000 tons of dried scrap and 32,000 tons of acidulated scrap. Not only has the catch been large, but the price also larger than last year. It is said that the catch of the year now closed has not been equaled in twenty years, and fully 50 per cent. more fish might have been taken had the factories been of sufficient capacity to handle them. It has been determined that food fish and menhaden do not school together, scarcely enough food fish being taken by the menhaden steamers to supply the wants of the crews in that direction. The United States Fish Commission caused a searching investigation to be made, with a view to determining this question, and has reported as above. Regarding the periodical scarcity or abundance of food fish many theories have been advanced, but no good reason has appeared for the sudden changes from scarcity to abundance and vice versa. Those who from experience and study of the subject would be deemed most competent to answer such questions, say that it is beyond the power of man to explain why fish, after having been supposed to be almost extinct along certain lines of coast, will suddenly appear in great quantities. The difficulty of regulating the ocean fisheries by legislation is therefore apparent, and serious results are apt to follow such attempts. Respectfully submitted.

B. FRANK WOOD,

Superintendent of Shellfisheries.

The English "Oyster Scare."

(SUPPLEMENTARY REPORT BY THE STATE SUPERINTENDENT OF SHELLFISHERIES).

To the Forest, Fish and Game Commission:

Gentlemen.—The death of the Dean of Winchester from typhoid fever, in England, has evoked widespread sympathy throughout the United Kingdom and in the United States, and the unfortunate circumstances attending his last illness have engendered a sensational state of public alarm, which is alluded to in the English press as "The Oyster Scare."

The assertion is made that the typhoid baccilli were, in this case, conveyed by oysters eaten at a Lord Mayor's banquet given in London, and in consequence the English oyster trade has been well nigh prostrated.

It should be noted that the oysters used at the banquet in question *were not American oysters*, but were taken, it is stated, from beds located in the south of England, and it is charged that over some of these beds "an outfall of sewage has been permitted to flow."

Whether oysters are ever the medium of distribution of typhoid germs is of course a question for medical men to determine. It is claimed by some authorities that the connection between typhoid and the oyster has never been scientifically established. Our chief duty and interest, however, is to thoroughly inform ourselves and the public concerning the purity of the sources of the oyster supply of our domestic and export markets.

PURITY CERTIFICATES FURNISHED.

On the third instant I received from the Forest, Fish and Game Commission a letter requesting that some guarantee of the wholesome character of the Blue Point and East River oysters be sent to the Commission for the information of the Governor of New York State, that the Governor might communicate with the Secretary of State at Washington in order that the representatives of the United States Government abroad might have the proper assurances of the freedom of New York oysters from contamination. Upon the same day I forwarded to the Commission certificates as follows:

"THIS WILL CERTIFY that the oysters known in the trade as 'East Rivers' are taken from beds situated in Long Island Sound, an important arm of the sea extending for one hundred and twenty miles between the south coast of the State of Connecticut and Long Island, in the State of New York, its greatest width being about twenty miles, narrowing to about two miles at its western extremity; averaging about twelve miles wide. These beds are remote from any possible contamination by sewage or otherwise, many of them being at a depth of sixty feet under pure sea water.

"Dated New York, January 3, 1903.

"B. FRANK WOOD,
"*State Superintendent of Shellfisheries.*"

"THIS WILL CERTIFY that the oysters known in the trade as 'Blue Points' are taken from beds located in Great South Bay, a great expanse of salt water lying along the south shore of Long Island in New York State, and with its extensions, known as Moriches Bay and Shinnecock Bay, having a total length of about sixty miles. These bays are from two to six miles wide and separated from the Atlantic Ocean by narrow strips of sand beach, through which are many inlets allowing the ocean tides to regularly ebb and flow. The oyster beds are at an average distance of about two miles from shore. The south shore of Long Island is sparsely settled and there is no possibility of sewage or other contamination.

"Dated New York, January 3, 1903.

"B. FRANK WOOD,
"*State Superintendent of Shellfisheries.*"

NO CAUSE FOR ALARM.

I immediately requested Mr. John E. Overton, one of the State Oyster Protectors, to interview some of our leading physicians, particularly those residing near our oyster grounds, upon the subject, that I might have their views. The letters which follow speak for themselves.

" NEW YORK STATE DEPARTMENT OF HEALTH,
" DANIEL LEWIS, M. D., COMMISSIONER.

"ALBANY, *January* 10, 1903.

" Mr. B. FRANK WOOD, *Superintendent of Shellfisheries, 1 Madison Avenue, City:*

" My Dear Sir.—Since I have been connected with the State Department of Health, first, as President, and recently, as Commissioner in charge of the Department, no case of typhoid fever has been reported to the Department in which the cause of the disease was attributed to the eating of oysters.

" In my private practice, where I have seen many cases, and in patients who habitually used oysters as an article of diet, I have never met a case in which I had the slightest suspicion that the infection had been communicated through diseased oysters. The legitimate inference, from my experience as a health officer, as well as in private practice, is that the infection of oysters by typhoid germs is practically unknown in this city and State. And it is my opinion that there is no danger of contracting typhoid from the free use of the oyster as a food. Any suggestion to the contrary is a mere speculation, unsubstantiated and unworthy of serious consideration.

" Very truly yours,

" DANIEL LEWIS,
" *Commissioner.*"

OTHER VALUABLE TESTIMONY.

From the neighborhood of the Blue Point beds come the following letters:

"PATCHOGUE, N. Y., *January* 8, 1903.

"This is to say that I have been in active practice among the residents and oystermen along the shores of Great South Bay during the past seventeen years. Oysters constitute the principal meat diet during the season of many of these people, and they are as free from contagious diseases as any people upon the earth. The oysters taken from the bay are absolutely pure and free from any germs of disease.

"W. S. BENNETT, M. D."

"In regard to the possible contamination of Great South Bay oysters with typhoid germs I write to say that I have never known of a case of typhoid fever which seemed to be caused by eating oysters from Great South Bay.

"ARTHUR H. TERRY, M. D."

"I wish to add my testimony to show how groundless is the English fear of typhoid fever coming from Blue Point oysters. In the first place, the south side of Long Island is exceptionally free from typhoid fever and all other infectious diseases. This can be verified by the State Health Board. Secondly, the infection of oysters from typhoid cases is almost impossible, for almost no sewers at all empty into the bay, and the few that do so are from single and detached houses. Thirdly, we folks all eat oysters in all forms, and I am sure that no more typhoid is found during the oyster season than at other times during the year. As to this point I am emphatic.

"Trusting that the prejudice against the product of which we are the most proud may soon be removed, I am, yours truly,

"FRANK OVERTON, M. D.,
"*Health Officer of Patchogue Village.*"

From the north shore of Long Island, along which are cultivated the East River oysters, we have the certificates of James E. Gildersleeve, M. D., a practitioner for fifty years; J. A. Dildine, M. D., practicing ten years, and D. F. Many, M. D., who has practiced for fifteen years, who unite in saying that they have never known of a case of typhoid fever which could be traced to eating oysters.

Wm. E. Sylvester, M. D., who is in the service of the State, and connected with the shellfish office, writes:

"Hon. B. FRANK WOOD, *1 Madison Avenue, City:*

"My Dear Sir.—Relative to the contamination of oysters, I will say that, after a long and extensive experience among people where it was an important article of diet, I have never seen a case of typhoid fever resulting therefrom. From a personal knowledge of the oyster industry about New York I am satisfied that no oysters obtainable are freer from objectionable influences than these.

"Yours very truly,
"WM. E. SYLVESTER, M. D."

A SATISFACTORY TEST.

"In 1896 a very careful examination was made in England by Professors Herdman and Boyce, of University College, who were furnished with oysters from almost every bed in the United Kingdom, on the Continent, and also in America. Not a single case was found in which there was anything in the oysters injurious to health. One of their tests was to inject typhoid germs into oysters which were then placed in salt water. The germs gradually disappeared, and in the course of a few days the oysters were clear of them. As a more severe test, oysters were placed at the mouth of a drain which connected with a dwelling in which at the time were typhoid fever patients, and the oysters were afterward found to be free from the slightest infection."

Clear sea water is a well-known purifier, and it seems to have been demonstrated that in it disease germs cannot long exist.

A considerable portion of the supply of good and wholesome food for our immense urban population, and much for export, is taken from the clear sea water surrounding Long Island and from Raritan Bay at Staten Island, and any suspicion concerning its purity is without reason or foundation.

New York, January 10, 1903.

B. FRANK WOOD,
State Superintendent of Shellfisheries.

Forest, Fish and Game Commission.

STATEMENT OF EXPENDITURES FOR THE FISCAL YEAR ENDING SEPTEMBER 30, 1902.

Forestry Account.

To paid for land purchased in Adirondack Park	$33,101 00	
To land purchased in Catskills	34,014 41	
To salaries and expenses superintendent of forests, inspectors, clerks, etc	7,852 46	
Printing surveying, searching and miscellaneous office expenses	2,508 95	
Services and expenses of attorneys, witnesses, etc.	6,250 38	
Rebates to towns on account fighting forest fires	2,300 96	
Firewarden and foresters, salaries and expenses	6,161 97	
Expenses of United States foresters making forestry plans	1,173 41	
Seeds and seedlings and expenses reforesting denuded lands	3,329 67	
Surveying, witness, court and attorney fees in protecting State's title to forest lands	1,710 26	
		$98,403 47

Propagation and Distribution of Fish.

Maintenance of hatcheries and hatching stations and collection and distribution of fish and fish fry.................	$49,963 45	
Purchase of land and construction of new hatchery at Margaretville, Delaware county..........................	4,740 00	
Construction of fishways in Salmon river............................	1,133 33	
Salary State Fish Culturist, three months	750 00	
		$56,586 78

Shellfish Department.

Salary and expenses of superintendent of shellfish.........................	$2,604 81	
Salary and expenses of three oyster protectors, cashier and confidential clerk.	7,044 62	
Rent of office, printing, stationery, etc..	1,713 85	
		11,363 28

Protection of Fish and Game.

Salaries of chief protector, two assistant chiefs and forty-four protectors......	$22,308 56	
Expenses of chief protectors, two assistant chiefs and forty-four protectors...	16,513 64	
Moieties paid to complainants from fines and penalties recovered............	5,052 41	
Justice, constable, witness and court costs............................	2,844 96	
Attorney fees and expenses of collection.	6,197 75	
Expenses of naphtha launch, repairs, labor, gasoline, etc................	1,733 09	
		54,650 41

Miscellaneous.

Salaries and expenses of commissioners.	$7,576 80	
Salaries of clerical force...............	5,525 00	
Office expenses	3,716 98	
State reservation on St. Lawrence......	439 35	
Pan-American and New York State Fair exhibit	298 74	
Wild moose and elk for Adirondacks...	1,667 48	
Printing 3,000 extra copies of game law.	225 00	
		$19,449 35
		$240,453 29

SUMMARY OF RECEIPTS AND DISBURSEMENTS FROM VARIOUS SOURCES EXCLUSIVE OF REGULAR ACCOUNTS WITH THE COMPTROLLER.

Receipts.

From fines and penalties collected..................	$8,484 66
From trespasses on State land.....................	7,391 76
From shellfish leases and franchises................	1,803 64
From net licenses issued..........................	1,422 00
From sales of timber and logs seized...............	969 17
From sales of whitefish...........................	46 34
From rebates on witness fees and court cases........	30 45
From sale of old barn on State land.................	15 00
From rental of camp site (Mrs. Stott)...............	20 00
From sale of old postal cards......................	2 30
	$20,185 32

Disbursements.

1901.				
Nov.	1.	By check to State Treasurer.............	$815	49
Dec.	2.	By check to State Treasurer.............	1,181	12
1902.				
Jan.	3.	By check to State Treasurer.............	1,457	35
Jan.	3.	By check to State Treasurer.............	46	34
Feb.	1.	By check to State Treasurer.............	1,128	33
March	1.	By check to State Treasurer.............	4,001	64
April	1.	By check to State Treasurer.............	2,098	93
May	1.	By check to State Treasurer.............	1,865	85
June	1.	By check to State Treasurer.............	1,392	50
July	1.	By check to State Treasurer.............	1,591	13
Aug.	1.	By check to State Treasurer.............	1,465	46
Sept.	1.	By check to State Treasurer.............	1,414	35
Sept.	30.	By check to State Treasurer.............	1,726	83
			$20,185	32

APPENDIX A.

Lands Purchased.

Lands Conveyed in 1902.

List of Lands Purchased for which Payment was Made Between January 1, 1902, and January 1, 1903.

ADIRONDACK PARK.

HAMILTON COUNTY.

Benson Township.

Bought of	Location.	Acres.	Price.	Amount.
John W. Olmstead	Lot 51	160	$4.00	$640 00
John W. Olmstead	Lot 53, N. end across	105	3.00	315 00

Lawrence Patent.

Bought of	Location.	Acres.	Price.	Amount.
National Herkimer Co. Bank	Lot 56, all of 90a. N. W. cor. sq. not contained in or covered by 97a. W. side of lot	70.9	4.74+	336 50
Total		335.9	....	$1,291 50

Average price, $3.83+ per acre.

CATSKILL COUNTIES.

GREENE COUNTY.

Hardenburgh Patent.

Great Lot 21, West Part.

Bought of	Location.	Acres.	Price.	Amount.
Edward Derrenbacher	Lot 57	186½	$2.50	$466 25

Great Lot 22, South Township.

Bought of	Location.	Acres.	Price.	Amount.
Edward Derrenbacher	Lot 3, W. ½	79¾	2.50	199 38
Edward Derrenbacher	Lot 5	144½	2.50	361 25
Edward Derrenbacher	Lot 6, W. part	46½	2.50	116 25
Edward Derrenbacher	Lot 13	127½	2.50	318 75
Edward Derrenbacher	Lot 14	137	2.50	342 50
Edward Derrenbacher	Lot 15	135¼	2.50	338 12
Edward Derrenbacher	Lot 16	143	2.50	357 50
Edward Derrenbacher	Lot 79	159¾	2.50	399 37
Edward Derrenbacher	Lot 80	148	2.50	370 00
Edward Derrenbacher	Lot 82	157½	2.50	393 75

ULSTER COUNTY.

Hardenburgh Patent—Great Lot 6.

Bowen's Survey of East Part—8,000 Acre Tract.

Pell (Robert L.) 4,000 Acre Tract.

Bought of	Location.	Acres.	Price.	Amount.
John C. Hoornbeek	Lot 13	100	$3.50	$350 00
John C. Hoornbeek	Lot 14	100	3.50	350 00
John C. Hoornbeek	Lot 15	100	3.50	350 00
John C. Hoornbeek	Lot 28	100	3.50	350 00
John C. Hoornbeek	Lot 29	100	3.50	350 00
John C. Hoornbeek	Lot 30	100	3.50	350 00

Bought of	Location.	Acres.	Price.	Amount.
John C. Hoornbeek	Lot 31	100	$3.50	$350 00
John C. Hoornbeek	Lot 32	100	3.50	350 00
John C. Hoornbeek	Lot 33	100	3.50	350 00
John C. Hoornbeek	Lot 34	100	3.50	350 00
John C. Hoornbeek	Lot 35	100	3.50	350 00
John C. Hoornbeek	Lot 36	100	3.50	350 00
John C. Hoornbeek	Lot 37	100	3.50	350 00
John C. Hoornbeek	Lot 38	100	3.50	350 00
John C. Hoornbeek	Lot 39	100	3.50	350 00
John C. Hoornbeek	Lot 40	100	3.50	350 00
Division 1, Denning Tract.				
Ephraim G. Adams	Lot 29	160	2.50	240 00
John C. Hoornbeek	Lot 32, E. part	60	3.50	210 00
John C. Hoornbeek	Lot 62, B'd beg. at cor. of lots 62, 63, 64 and 65, th. S. 52° E. 40c. to cor. of lots 62, 63, 46 and 47, th. S. 48½° W. along line of lots 62 and 47, 30c. to cor. of L. Barber's, th. N. 52° W. along said line 18c. to a pile of stones, th. S. 48½° W. 10c. to line of lots 61 & 62, 18c. to cor. of lots 61, 62, 65 and 66, and th. N. 48½° E. along line of lots 62 and 65, 40c. to beg.	142	3.50	497 00
Division 3, Robinson Tract.				
Elbert F. Davidson	Lot 215	143	2.00	286 00
Arthur and Minnie S. Jones	Lot 248, Ex. 40a. E'ly pt.	94	2.00	188 00
Arthur and Minnie S. Jones	Lot 268	120	2.00	240 00
Arthur and Minnie S. Jones	Lot 271	117	2.00	234 00
Arthur and Minnie S. Jones	Lot 275	136	2.00	272 00
Arthur and Minnie S. Jones	Lot 276	136	2.00	272 00
Great Lot 7—Chambers Survey.				
John C. Hoornbeek	Lot 7	79	3.50	276 50
Division 1.				
Edwin DuBois	Lot 6, Ex. 150a. being all that remains of 214a. in N. E. part of lot b'd beg. at a pile of stones in E'ly line of said lot, being line bet. Gt. Lots 7 and 8, 25c. E'ly from where said line crosses the woodland stream opposite three marked soft maple trees on E. side of said stream, th. from said pile of stones as the compass pointed Jan. 1901, S. 37° W. 10c. to the center of a hollow or dry run, th. due W. along the side of the mountain about 32c. to a hemlock marked, and stones standing on the W. side of a woodland stream, th. N. 51° W. on a line parallel with and 30c. from line between Gt. Lots 7 and 8 to the line of Lot 5, th. N. 37° E. along said line 30c. to line bet. Gt. Lots 7 and 8, the same being the N'ly cor. of Lot 6, th. S. 51° E. along said Gt. Lot line and the N'ly line of said Lot 6, 83c. to beg. after ex. therefrom 64a. N'ly part thereof b'd beg. at N. W. cor. of Lot 6, at the cor. of Lot 5, th. S. 51° E. along N'ly lineof Gt. Lot 7, 21c. th. S. 39° W. parallel with W. line of lot, 30c., th. N. 51° W. parallel with N. line of Gt. Lot 7, 21c. to division line bet. Lots 5 and 6, and th. N. 39° E. along said division line to beg.	915	2.00	1,830 00
Edwin DuBois	Lot 7	1,065	2.00	2,130 00
Vernooy's Survey.				
John C. Hoornbeek	Lot 29	160	3.50	560 00
John C. Hoornbeek	Lot 45, N. part	120	3.50	420 00
John C. Hoornbeek	Lot 46	200	3.50	700 00
John C. Hoornbeek	Lot 49	200	3.50	700 00
John C. Hoornbeek	Lot 50	200	3.50	700 00

Great Lot 8, Allotment West of Esopus Creek.

Bought of	Location.	Acres.	Price.	Amount.
Edwin DuBois	Lot 2, in W. end, b'd beg. on the line formerly of H. D. H. Snyder, now Jno. A. Lord, at a basswood tree and stones about 20c. W. of the Cross Mountain Brook, th. S. 34° 30′ W. 45c. to a yellow birch tree cornered and marked, on the line between Great Lots 7 and 8, th. S. 54° E. on the line of said Great Lots 27c. to cor. of lots 2 and 3, th. N. 72° E. 21c. to center of Cross Mountain Brook, th. down center of said brook 7c. to a hemlock tree on said brook, cornered and marked, being the boundary of said party of the first part and John A. Lord, th. as the compass pointed in 1900, N. 21 W. 26c. to two butternut trees cornered and marked, th. S. 59° W. 4c. 501 to a large rock on the upper side of the Wittenburg road and th. N. 21° W. 17c. to beg.	124	$1.75	$217 00

Joanna Livingston or Sherwood Tract.

S. S. & B. A. Kissam, Admrs.	b'd beg. at a hemlock cornered, and stones marked P. R. L. D. H. B. 1833, in line between Great Lots 7 and 8, Hardenburgh Patent, where it intersects the line between the Joanna Livingston Tract, and the Peter R. Livingston Tract, th. N. 35° 30′ E. 36c., th. N. 56° W. 46c. 211 to stones with trees witnessed, th. S. 35° 30′ W. 16c. to a hemlock tree at S. E. cor. of the Harrington lot, th. N. 56° W. along said lot 50c. to a hemlock sapling against Fork Ridge, th. N. 35° 30′ E. along said Harrington lot and the Larkin lot 40c. 501 to a stump and stones, th. S. 52° 30′ E. 49c. to stones near a beech tree, on line of the Lord lot, th. N. 35° 30′ E. 35c. to Beech and Woodworth's 600a. lot, th. N. 56° W. along said 600a. lot and the 76a. lot sold Beech & Woodworth 22c., th. N. 26° E. along line of said 76 acre parcel 62c. to the line of Beech & Woodworth's 600 acres, th. N. 56° W. along line of Beech & Woodworth's 600a. 22c., th. N. 34° E. along line of Beech & Woodworth's 600a. 29c., th. N. 55° 40′ W. 32c. to center of the Painter Kill, th. following the course of said Kill, W'ly, as it winds and turns, 27c. to a hemlock tree, cor. of the 44a. sold to P. Conway, th. S. 16° W. along said Conway's lot 20c. to a cluster of beeches, th. N. 74° W. along said Conway lot 22c. to stones in an old bark road 201 from a hemlock tree, th. N. 16° E. 20c. and across the Painter Kill to basswood and stones in line of Pat Conway's 75a. lot, th. N. 74° W. 12½c. to line of John Conway, th. S. 15° 15′ W. 12c., th. N. 75° W. 77c. 201 to a heap of stones and birch tree, th. N. 15° 15′ E. 42c. to a heap of stones and brush, th. S. 75° E. 99c. 41 to two hemlocks, th. S. 15° W. 8½c. to the cor. of the Kelsey lot, th. N. 34° 20′ E. along the Kelsey lot 20c., th. S. 55° 40′ E. (in 1851) 30c. to the bounds of the Longyear 98a. lot, th. N. 34° 20′ E. 35c. and across the Muddy Brook, th. N. 56° W. 20c. to Longyear 110a. lot, th. S. 34° W. 5½c. to the Muddy Brook, th. N. W'ly along Muddy Brook, as it winds and turns, 21c. to the bounds of Cullen's 80a. lot, th. S. 34° W. along the bounds of the Cullen lot about 1c., th. N. 56° W. along bounds of Cullen 20c. to the J. Murray lot, th. N. 55° 30′ W. along lot of J. Murray 64c. to maple tree and stones, th. S. 34° W. 10c. 681, th. N. 56° W. 4c., th. S. 65° W. 63c. to stones and birch tree marked S. W. 1850, th. S. 34° W. 156c. to line of Great Lot 7, th. S. 56° E. 305c. to beg.	4,259.68	2.75	11.714 04

Bought of	Location.	Acres.	Price.	Amount.
S. S. & B. A. Kissam, Admrs.,	b'd beg. on line bet. the Joanna Livingston Tract and the Peter R. Livingston Tract, at a point about 156c. 50 l. N. 34° E. from the line bet. Gt. Lots 7 & 8, and being also a cor. of the 102 acres sold to Beech & Woodworth, th. N. 14° W. 36c. 75 l. to the Beech & Woodworth 600a. lot, th. N. 34° E. along said 600a. lot 25c., th. N. 56° W. along said 600a. lot, 30c. to the bounds of the H. D. H. Snyder 248a. lot, th. N. 14° W. 55c. through the 248a. lot of H. D. H. Snyder to the W'ly line thereof, th. N. 34° E. along W'ly line of said 248a. lot about 25c., th. S. 56° E. along the line of said 248a. lot 40c. to bounds of Christian Winne lot, th. S. 34° W. along said Winne lot about 10c. to a corner thereof, th. S. 12° E. along said Winne lot 84c. to line bet. the Joanna Livingston Tract and the Peter R. Livingston Tract, th. S. 34° W. along said tract line 44c. to beg.	419	$2.75	$1,152 25

SUMMARY—CATSKILL COUNTIES.

Counties.	Acres.	Paid.
Greene	1,465.25	$3,663 12
Ulster	10,449.68	28,439 11
	11,914.93	$32,102 23

Average price, $2.69 per acre.

APPENDIX B.

Prosecutions by Order of the Commission for Violations of the Forest and Game Laws.

Total number of actions brought	518
Trespass cases	88
Illegal fishing and hunting cases	430
Fines and penalties collected	$17,753 05

Of those convicted several were unable to pay the fines imposed and consequently served time in jail.

There were also fifteen actions brought in the Supreme Court for trespass and ejectment from State land. These are now pending, as are also two other important ejectment proceedings which were begun prior to the past year.

During the year the protectors seized and destroyed 2,463 illegal devices for taking fish, which were valued at a total of $26,035.

APPENDIX C.

Fish Distribution.

Record of Each Hatchery During the Year 1902.

Adirondack.— Brook trout, 2 to 5 years old, 1,640; frost fish, 200,000; brook trout fry, 202,000; lake trout fry, 350,000; brook trout fingerlings, 220,000; rainbow trout yearlings, 3,750; rainbow trout fingerlings, 68,500; lake trout fingerlings, 10,200; whitefish, 2,500,000; total, 3,556,090.

Caledonia.—Red throat trout yearlings, 24,750; red throat trout fingerlings, 68,000; grayling trout fry, 25,000; brook trout fry, 217,000; brown trout fry, 695,000; lake trout fry, 535,000; brook trout yearlings, 26,220; brook trout fingerlings, 57,300; brown trout yearlings, 2,000; brown trout fingerlings, 48,000; rainbow trout yearlings, 30,856; rainbow trout fingerlings, 11,500; lake trout yearlings, 53,750; lake trout fingerlings, 74,750; black bass, adult, 10,000; rock bass, adult, 14,000; pike perch, 2,675,000; whitefish, 17,500,000; yellow perch, adult, 1,000; total, 22,069,126.

Chautauqua.—Mascalonge, 2,210,000.

Constantia.— Pike perch, 50,078,000; whitefish, 11,781,000; total, 61,859,000.

Cold Spring.— Tom cods, 27,000,000; brook trout fry, 260,000; brook trout yearlings, 11,900; brook trout fingerlings, 93,500; shad, 125,000; total, 27,490,400.

Fulton Chain.— Frost fish, 2,750,000; brook trout fry, 185,000; rainbow trout fry, 17,000; lake trout fry, 205,000; brook trout fingerlings, 64,000; lake trout fingerlings, 81,400; total, 3,302,400.